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THE RIVER FINDHORN

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The basin of the Findhorn is to be regarded as the area of which the drainage passes into the Moray Firth across the bar of Findhorn at the mouth of Findhorn Bay, and includes the basins of the Muckle Burn on the west and of the Forres and Kinloss burns on the east, these streams entering the bay independently at high water. The basin, measured on the one-inch maps, has an area of 392 square miles.

The three main headstreams that unite to form the Findhorn proper are the River Eskin, Abhainn Crò Chlach, and Elrick Burn. Of these the second rises furthest from the sea and may be reckoned the headstream of the river, though at their point of union the Eskin has perhaps a somewhat greater volume. The source of the Abhainn Crò Chlach is situated between Càrn Odhar na Criche and Beinn Odhar at a height of 2770 to 2780 feet.

The total length of the Findhorn, if we neglect some minor bends in its upper reaches, is 61·16 miles. The average fall of the river is therefore over 45 feet per mile. This with the still more rapid fall of its tributaries causes everywhere a quick run-off. The convergence, within a short distance, of three large headstreams draining an elevated plateau, many square miles in area and receiving a heavy rainfall, often causes sudden flooding in the lower reaches. There it is no unusual occurrence to see a considerable rise of the river when locally no rain has fallen perhaps for many days.

For purposes of description and reference the Findhorn may be divided into three sections :—

1. The Upper Findhorn (1) from Findhorn Bridge to Invereen, (2) from the source to Findhorn Bridge ;
2. The Middle Findhorn, from the funnel-like entrance to the Polochaig (Shenachie) water-gap to Dulsie Bridge ;
3. The Lower Findhorn, from Dulsie Bridge to the sea.

I. The Upper Findhorn

(1) The most striking feature in the physiography of the entire basin is the wide hollow between Craggie and Invereen connecting the Nairn and Findhorn valleys. It is prolonged beyond Invereen and Findhorn Bridge to Slochd Mòr. A gorge eroded during the Ice Age by meltwater discharged south-eastward across the Findhorn-Dulnan watershed,[1b] the Slochd Mòr lies on the floor of a wide gap which, apart from the gorge, is nearly 500 feet deep.

A wide, old valley, in fact, slopes nearly continuously from Slochd Mòr to the Nairn. There seems no valid reason for adopting the theory that this valley marks the track of an Early Tertiary consequent river which flowed south-east but was rendered obsequent during the denudation that excavated Glenmore, along the shatter-belt accompanying the great fault, and formed the plain of Moray.[1d] It is significant that no suggestion has ever been made regarding the continuation of this Early Tertiary river towards its sources in the north-west or along its lowest reaches to the south-east. Further, undoubted cases of long stretches of a consequent river being rendered obsequent are rare unless conditions (*e.g.* rock structure, rock composition, etc.) are extremely favourable.

But, apart from all theories about the development of the Scottish river system, it seems clear that at an early stage in the physiographical history of the country a large river (Fig. 2 (4)-(6)) * followed from south-east to north-west the route described, and at the latest stage in its history reached the sea by the Nairn valley.[1b] The sources of this river are to be sought in the Cairngorm massif, perhaps in the River Druie (Am Beanaidh plus Allt Druidh). It has been dismembered through capture by encroaching subsequents —Spey, Dulnan and Middle Findhorn.

(2) The remarkably straight course of the Abhainn Crò Chlach is in line with the upper three-fourths of Glenmarkie, and further on in the same line lies the depression containing Loch Crunachdan, which again is aligned with another hollow beyond Loch Laggan. All this suggests what future survey may reveal, namely, a line of fault by which the track of the Abhainn Crò Chlach has been determined.[1b] Elsewhere study of the geological map (Sheet 74) discloses no apparent relation between the course of the Upper Findhorn and geological structure, for strong and weak rocks are crossed indifferently : the same is true of the Lower Findhorn and of all but a couple of miles of the Spey.

But it is characteristic of subsequents—and all the rivers mentioned are certainly subsequents—to develop along lines of weakness —of weak rock-structures and/or weak rocks. It seems not unreasonable to suppose that Old Red Sandstone and perhaps younger rocks entered into the structure of the plateau, guided the develop-

* In Figs. 1-4 the Horizontal Scale is 1 inch to 1 mile.

ment of the rivers and subsequently were entirely removed by denudation. One has difficulty in imagining how the Spey and Findhorn pursued their highly successful careers as encroaching subsequents without assistance of the kind postulated. It has to be remembered, too, that Old Red Sandstone is found at over 1100 feet on the Middle Findhorn, at 1207 feet on Meall Mòr, four miles north-west of Loch Moy, at 1928 feet on Beinn Meadhonich near Tomintoul, and at 2248 feet on Meallfuarvonie, which crowns a plateau from which most of the sandstones and conglomerates have been stripped. The Upper Findhorn's general reckless disregard of structure may be due to superposition from an unconformable cover of younger rocks, chiefly Old Red Sandstone.

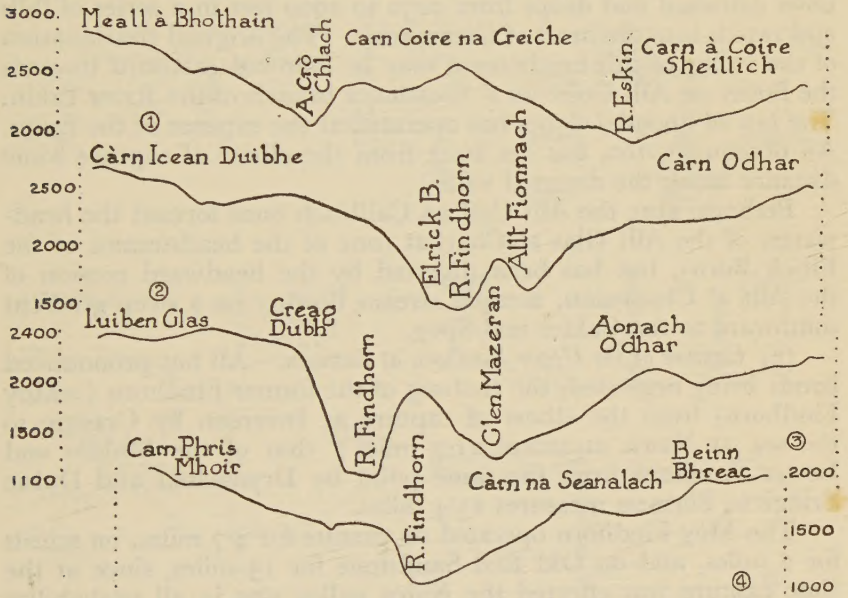


FIG. 1. Sections across the dissected High Plateau, Upper Findhorn Basin.

Glaciation has played its part in shaping the valley of the Upper Findhorn. The glacial U shown in Fig. 1 (3) is unmistakable, and elsewhere there is ample evidence of widening of the valley and oversteepening of its walls by ice.

Hanging tributary valleys are numerous and well-marked, particularly on the right side ; and, though such valleys are often explicable as a result of glaciation, it would be rash to claim that they are so in this instance. The Elrick Burn (Fig. 5) provides the most remarkable example : the " hang " only appears four miles back from the valley-wall of the Findhorn—too far for the stream to have eaten back by headward erosion in interglacial and postglacial times. The same is true of other well-marked hanging valleys like those of the Allt Deamhaidh, Allt Fiondarnaich, Allt à Mhuilinn, right-bank tributaries. The left-bank tributaries show

" hang " in a less decided way : they drain ground that is on the whole lower than that on the right side of the river.

There is no trace in the shape of valley-within-valley of rejuvenation of the main stream (Figs. 1, 2 (1)-(3)), and the " hang " cannot be explained like that of the tributaries of the Middle Findhorn (*vid. inf.*). It would seem that the Upper Findhorn, by steady down-cutting, aided in some measure by glacial deepening, has sunk its valley deep into the substance of the High Plateau and outpaced its tributaries, which throughout their history have done and are doing their best to catch up with it.

One clear case of piracy may be noted. The present headstream of the Glenmarkie Burn, a tributary of the River Killin, flows eastward and drops from 2250 to 2000 feet in a series of falls and rapids into the head of Glenmarkie. The original continuation of the valley of this headstream may be followed eastward towards the Bothy on Allt Coire an t' Sreatha, a branch of the River Eskin. The law of unequal slopes has operated at the expense of the Eskin. An obsequent, too, has cut back from the elbow of capture some distance along the deserted valley.

Perhaps, also, the Allt Cuil na Cailleach once formed the headwaters of the Allt Glas a' Charbat (one of the headstreams of the Elrick Burn), but has been diverted by the headward erosion of the Allt a' Chaoruinn, a rapid stream flowing on a steep gradient southward to the Calder and Spey.

(3) *Capture of the Upper Findhorn at Invereen.*—All but pronounced bends being neglected, the thalweg of the former Findhorn (=Moy Findhorn) from the elbow of capture at Invereen by Craggie to the sea at Nairn measures 21·7 miles ; that of the Middle and Lower Findhorn from the same point by Drynachan and Dulsie Bridge to Binsness measures 25·4 miles.

The Moy Findhorn operated on granite for 4·7 miles, on schists for 2 miles, and on Old Red Sandstone for 15 miles, since at the time capture was effected the Nairn valley was in all probability floored by sandstone from Craggie to the sea. The Middle and Lower Findhorn traverse 6 miles of granite, 13·4 miles of schist and 6 miles of Old Red Sandstone; but for about 6½ miles—in the Streens —the valley has evidently been determined by the line of weakness produced by a pair of faults that drop the Old Red into the schists, and here again erosion may well have begun on a sandstone floor.

The coastline and the relative levels of the thalwegs of the two competing rivers being supposed to be much as they now are, there seems no reason for capture of the Moy Findhorn by its northern neighbour. The latter would have had the advantage neither of a shorter and steeper route to the sea nor of less resistant rocks to work upon.

For most of the distance between Invereen and the Nairn no rock crosses the old valley-floor. Loch Moy, 880 feet above O.D.,[3a] is 50 feet deep [6a] and its floor is at least 30 feet below the present

bed of the Findhorn at Invereen. The corrom watershed of course shows no rock. The Craggie Burn flows towards the Nairn with a steep fall of 400 feet in a little over 2 miles, and no rock is met with in its bed till a level is reached much below that of the deepest part of Loch Moy. It seems quite possible that if all the debris, glacial—boulder clay, moraines, sands and gravels—and alluvial, were cleared out of its former valley, the Findhorn *might* again flow to join the Nairn.

That the Moy hollow is the former valley of a large stream is evident from the sections in Fig. 2 (4)-(6). From a map it can be seen that streams which enter the old valley between Findhorn Bridge and Craggie were originally feeders of a continuous stream

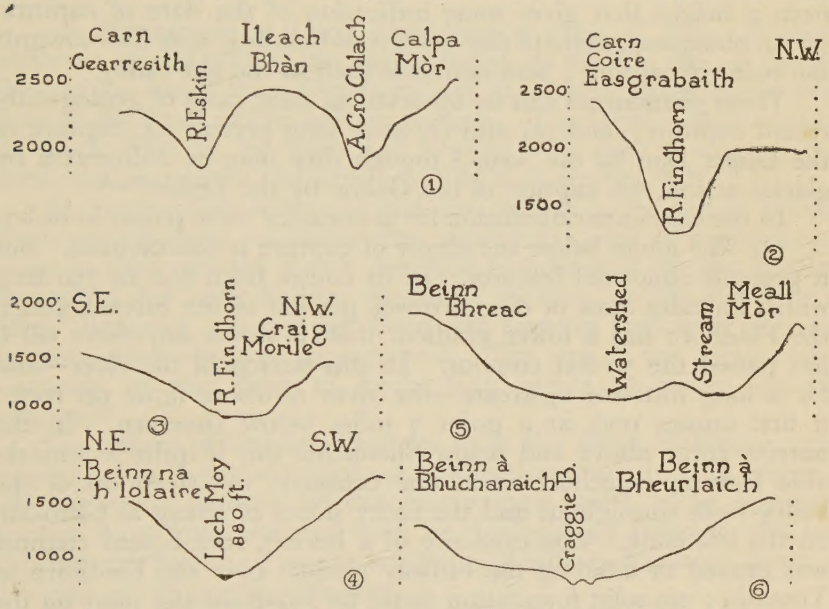


FIG. 2. Cross profiles of the Upper Findhorn (1, 2, 3), and Loch Moy Hollow (4, 5, 6).

flowing N. 30° W. The Middle and Lower Findhorn then formed a distinct river, and the watershed between it and its southern neighbour ran in a nearly straight line from Càrn Glas-choire to Càrn nan tri-tighearnan and Beinn Buidhe Mhor. As things now stand we find here the only instance among Scottish rivers of two sets of tributaries flowing in opposite directions from secondary watersheds transverse to the course of the main river. The only exception seems to be the Allt an Sean-achaidh (=Shenachie Burn, not named on the one-inch map) that rises on Carn Kincraig, flows S.S.W. and then, executing a complete turn, flows N.N.W. to join the Findhorn at Shenachie. Its original continuation, however, is to be found in the Allt nam Meannan that enters the Findhorn at Ruthven. The *volte-face* made by the Allt an Sean-

achaidh indicates a clear case of capture. Another tributary, of which that just discussed was a feeder, followed the present line of the Findhorn from Creag a' Chrocain to Invereen. This stream and the then headwaters of the Middle and Lower Findhorn formed a pair of "opposing streams" working against each other; the latter prevailed and captured the whole of the Upper Findhorn.

What physiographical evidence may one look for as proof of capture of one river by another? (*a*) When capture is achieved the whole volume of the pirated stream augments the small volume of the actual pirate and, there being now an easier route to the sea, a gorge will be eroded below, at, and above the elbow of capture. (*b*) The deserted valley-floor of the victim overlooks this gorge from a height that gives some indication of the date of capture. (*c*) An obsequent, perhaps due to corrom-building, may flow towards the point of capture; and entrench itself in the old valley.

These phenomena can be observed in most cases of geologically recent capture; and (*a*) and (*b*) may long persist, *e.g.* capture of the Upper Don by the Avon,[5] though they may be obliterated by glacial action, *e.g.* capture of the Geldie by the Feshie.[2a, b]

In the case under discussion let us consider these points in order.

(*a*) The gorge below the elbow of capture is conspicuous. But it presents abnormal features. In its course from 850 to 750 feet, which includes most of the narrower portion of the Streens gorge, the Findhorn has a lower gradient than it shows anywhere till it has passed the 50-feet contour. In this stretch of the river—and for a long distance upstream—the river nowhere flows on rock: it first crosses rock at a point 7 miles below Invereen. In the narrow gorge above and below Shenachie this is quite a remarkable feature, especially when one considers the steepness of the valley-walls throughout and the rocky slopes of Creag a' Chrocain on the left bank. The existence of a buried, rock-bound channel was proved in building the railway viaduct over the Findhorn at Tomatin: no solid foundation could be found for the piers on the east bank.[3b]

(*b*) In the mid-line of the old valley the maximum height of the rock-floor above the Findhorn at Invereen (*i.e.* on the alluvium-shrouded watershed) cannot exceed 50 feet and is probably much less (*vid. sup.*). The original height was no doubt lowered by the Moy Burn before it became obsequent. This difference of 50 feet may be compared with the height of 174 feet from which the head of the old valley of the Don overlooks the elbow of capture on the Avon, where it may be noted there is only a tiny obsequent. If, however, the depth of the buried valley of the Findhorn were known, the difference would not be so striking.

(*c*) After the Moy became obsequent it can hardly be credited, unless a liberal allowance of time be granted, with eroding in rock the wide, eastward-falling valley, now floored with glacial deposits, which it follows to the Findhorn.

These considerations suggest that capture is anything but recent ; and others point to the same conclusion.

The Findhorn at Invereen is now 860 feet above O.D. ; the Nairn at the other end of the Moy hollow, 7 miles away, is in round numbers 360 feet lower. There was not this difference when capture took place. Since then the Nairn by normal, glacial and fluvioglacial erosion has lowered its bed very considerably ; for the fall from the elbow of capture towards the Nairn must have been less than that down the Findhorn, else no capture could have been effected. The present low gradient of the Findhorn below the elbow of capture is altogether abnormal and requires special consideration (*vid. inf.*).

(4) *Physiography of Lower Strathdearn or Plain of Moy.*—At two different glacial stages, the last included, of the Ice Age, a strong flow of ice issued from Glenmore and the Nairn valley across the pass at the head of the Midlairgs Burn. The latest flow travelled by Loch Moy to Invereen and beyond : its path is marked by striae and numerous characteristic Old Red erratics.[1d, 4b]

At the junction of the old and new valleys in the hollow round Invereen all three ice-sheets were bound to cause strong erosion, since in their onward march they had to surmount the rim of hills bounding this wide hollow, the Plain of Moy, on the north and east. Bed-rock was ground down and features indicative of river capture were obscured or removed. The run of the subaqueous contours on the floor of Loch Moy points to strong glacial erosion.[6c]

On retreat of the last ice-sheet from the Plain of Moy a vast amount of outwash was piled up, still further obscuring the original physiographic features of this picturesque basin. The outwash gravels have been terraced both by fluvioglacial action as the ice retired and by fluvial action while the Findhorn has been striving to clear out its preglacial valley.

These terraces now form the outstanding physical features of the area. It has been suggested [3a, b] that they point to the existence of a glacial lake, dammed by glacial accumulations in the Polochaig * gap, which overflowed across the watershed to the Nairn. The objections to this view are that (1) there are no horizontal terraces, (2) there are no typically lacustrine deposits, and (3) there is ample evidence that in late glacial or postglacial times no flow of water has crossed the watershed.

Loch Moy is said [1d, 6a] to be impounded by " fluvioglacial deposits . . . laid down against an isolated mass of ice during the retreat of the Findhorn glacier," or in other words it lies in a kettle-hole. The mound of glacial debris that holds up the loch at its southern end rises for much of its length well above 900 feet

* " Polochaig," the name of a ruined homestead opposite Shenachie, has disappeared from recent maps.

(notwithstanding what all the Ordnance one-inch maps say to the contrary) ; and, while a good deal of sand and gravel (fluvioglacial or gravel moraine ?) is found at some points on its summit, a chance opening on its south side revealed some years ago typical morainic material with several large slabs of conglomeratic sandstone that could have come only from Nairnside. The mound seems to be a (terminal) moraine of retreat laid down by the Nairn ice :

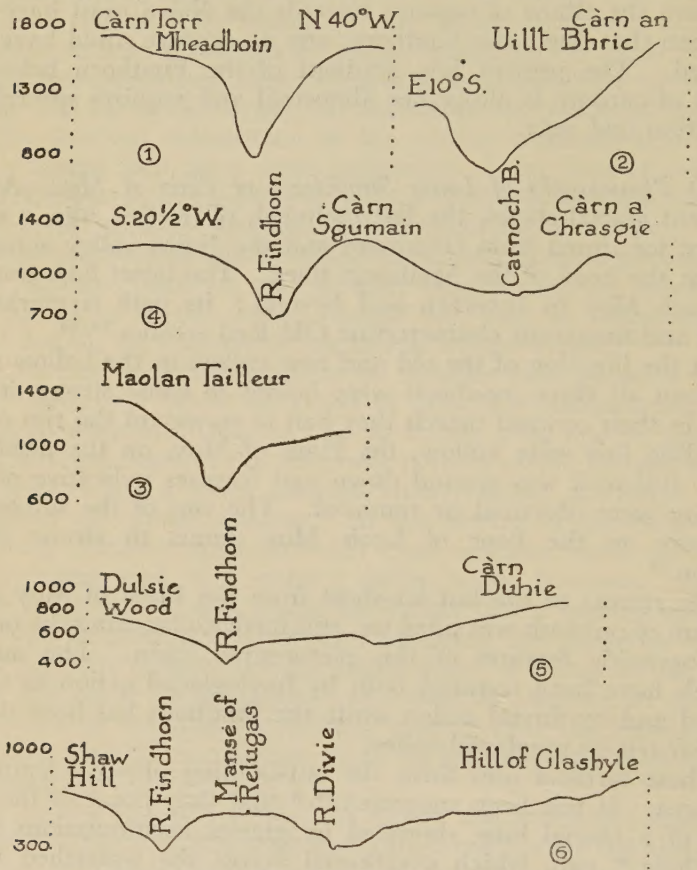


FIG. 3. Cross profiles of the Middle (1, 2, 3, 4) and Lower Findhorn (5, 6).

numerous lateral moraine mounds and ridges—and marginal melt-water channels—can be traced westwards from it all the way to the head of the Midlairgs Burn. The fluvioglacial gravels from the loch to Tomatin and Ruthven have as their most characteristic components Old Red conglomerate pebbles, including some of liver-coloured quartzite, and many pieces of sandstone and conglomerate—all Glenmore and Nairnside rocks. The last ice to occupy the Plain of Moy came from Nairnside, not down the Upper Findhorn valley.

It is hardly correct to make the following unqualified statement : " The Lower Findhorn cut its channel back through crystalline schists and granite and along the shatter-belt above Drynachan Lodge to Invereen, where it beheaded . . . the Upper Findhorn. This development led to a further modification of the local drainage system. The Moy Burn . . . has been deflected by a corrom or delta watershed * and made to flow southwards into Loch Moy which discharges by the Funtack Burn into the Findhorn." [1d] The Moy Burn was deflected long before the Ice Age—on solid rock—towards the Findhorn ; the preglacial corrom was swept away by the ice ; the existing corrom, which has filled a large part of the original lake, is postglacial ; and the Funtack Burn—and the Findhorn at the elbow of capture as well—are now flowing over glacial deposits.

II. Rejuvenation of the Middle and Lower Findhorn

The profile of the Findhorn (Fig. 5) shows a remarkable similarity to that of the Spey. The Middle and Lower Findhorn, however, unlike the Lower Spey, have had their erosion history affected by increase of volume through river capture. The history of the Lower Spey is therefore simpler and easier to interpret, though hitherto no satisfactory interpretation has been offered ; and, since it throws light on the history of the Findhorn, it may profitably be discussed here.

Mr. Hinxman considers the steep fall and rapid flow of the Spey below, and its sluggish flow above, Grantown as " the effect of an uplift or elevation of the land along an axis running north and south somewhere about Grantown." That the Lower Spey has been rejuvenated by uplift is evident, but the phenomena which might theoretically be expected from such an uplift as Mr. Hinxman described in 1901,[2a] and has repeatedly referred to since, need to be clearly formulated. Rejuvenation by an uplift along an axis crossing a river's course implies certain consequences.

(1) The characteristic mark of rejuvenation is the formation of a valley-within-a-valley.

(2) The inner, young valley will be deepest where the rejuvenated river crosses the axis of uplift, *i.e.* where uplift is at its maximum.

(3) The smaller tributaries in the rejuvenated stretch may not yet be graded with reference to the floor of the inner valley, and will enter the main stream from hanging valleys ; the " hang " will be most marked where the inner valley is deepest.

(4) The bulge or anticlinal uplift, though of no great height, will be of considerable breadth and will fade out downstream and upstream from the axis of elevation, while the inner valley will decrease in depth *pari passu*.

* The actual watershed is formed by the alluvial fan of the Dalriach Burn.

(5) Unless vertical erosion keep pace with the rise of the anticline, that rise will tend to produce on its upstream side a tectonic lake, though alluviation may obliterate it or altogether prevent its formation.

All these phenomena are exemplified in the Spey valley. Study of Fig. 4 (1) * shows in the clearest possible manner that the axis of uplift did not cross the river at Grantown, for at that point there is no inner valley. Grantown either has not been elevated

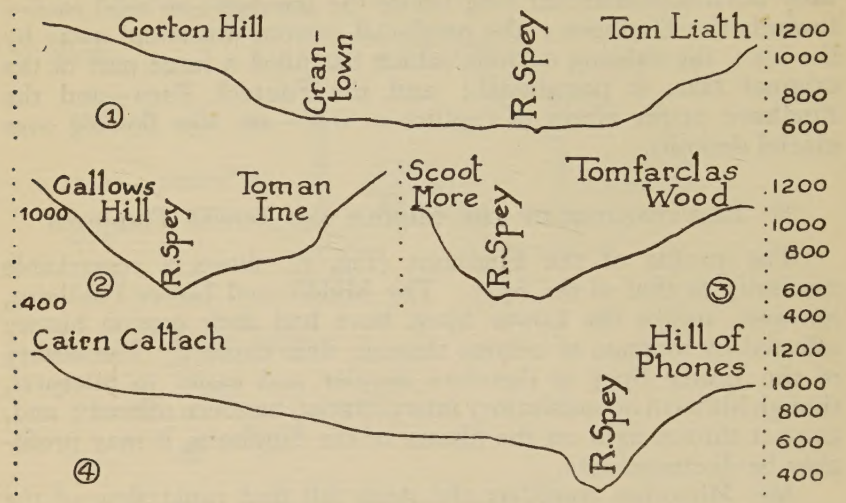


Fig. 4. Cross profiles showing rejuvenation of the Lower Spey.

or the wave of rejuvenation has not yet reached that point : the latter is probably the true state of affairs.

An inner valley is quite evident in Fig. 4 (2), a transverse profile drawn 11 miles below Grantown ; is increasingly clear in Fig. 4 (3), drawn a few miles further down ; and at Knockando, some 19 miles from Grantown, reaches its maximum depth.

The wide outer valley is a striking feature in the landscape from any good viewpoint between Blacksboat, Knockando and Archiestown (Fig. 4 (4)). The pre-uplift line of the river seems to be now about 600 feet above O.D. near Knockando, slightly below that of the river in its present stage of development at Grantown. Around Craigellachie, 6-7 miles below Knockando, the bed of the unrejuvenated river declined in level and does not now reach 500 feet above sea-level.

From below Grantown to the sea the Spey is nearly everywhere actively engaged in deepening its valley : the gradient, with some slight irregularities, is uniform—15-16 feet per mile, and even near the sea is steep.

* The profile (Fig. 4 (1)) is not drawn from the Popular Edition of the one-inch map ; for at Grantown the 750-feet contour is, on the evidence of a spot-level on the map itself, badly misplaced.

Turning once more to the Findhorn one finds peculiarities similar to those of the rejuvenated Spey—the steep gradient and hanging valleys of the portion of the river below, and the unusually low gradient above, Drynachan. These features lead to the assumption of an anticlinal axis crossing the Lower Findhorn.

From Blacksboat the Spey curves round the Hill of Phones and below Knockando flows from west to east for 4 miles in a series of entrenched meanders. Here, about 57° 27′ N., the axis of the anticline must cross the river. If this axis be continued westward it reaches the Findhorn near Dulsie and the 3½-miles west-east stretch of the river where rejuvenation is evident and the hanging valleys are striking (Figs. 5, 3 (3)).

Below Dulsie (Fig. 3 (5), (6)) the valley is so encumbered with glacial debris that even after a long, difficult and laborious investigation it would not be easy to form a clear mental picture of its preglacial form. At the present time the river from Dulsie to Cothall flows in a series of entrenched meanders that seem to bear little relation to the preglacial valley-floor ; it flows for nearly the whole distance in a series of rock gorges of late glacial and postglacial age, up to fifty and more feet in depth and hardly wider at the top than the river bed.

In the 17·62 miles from the 700 feet to the 100 feet contour the gradient is 34 feet per mile : the river falls from the 600 feet to the 100 feet contour in 14·45 miles, a gradient of 34·46 feet per mile. It is likely that this steepness of gradient may be due in part to postglacial diversion at numerous places on to the rock walls and spurs of the preglacial valley. The Aberdeenshire Don for the last six or seven miles of its course has been diverted by glacial deposits on to rock at five different points : it has acquired from this cause alone a gradient practically the same as that of the rejuvenated Lower Spey—a gradient in marked contrast to that of the section of the river immediately above.[5] But it is difficult to believe that postglacial diversions can be the sole—or the main—cause of the steep gradient of 34-35 feet per mile over 14·45 miles of the Findhorn's course. In the straight west-to-east stretch from 700 feet to 600 feet, where it is certain no postglacial diversion has occurred, the gradient is almost as steep—31·54 feet per mile. Elevation and rejuvenation played the major part in producing the steep gradient of the Middle and Lower Findhorn.

Above Drynachan the gradient is—for the Findhorn—abnormally low, *i.e.* 14 feet per mile (*vid. sup.*). The low gradient and the aggradation of the river bed in this stretch are attributable to the same cause as the low gradient and waste-filled valley of the Spey above Grantown.

Between Drynachan and Dulsie the valley is for the most part not greatly encumbered by glacial deposits : valley-within-valley is conspicuous (Fig. 3 (2), (3), (4)). The inner valley is about 300 feet in depth and altogether more striking than the same

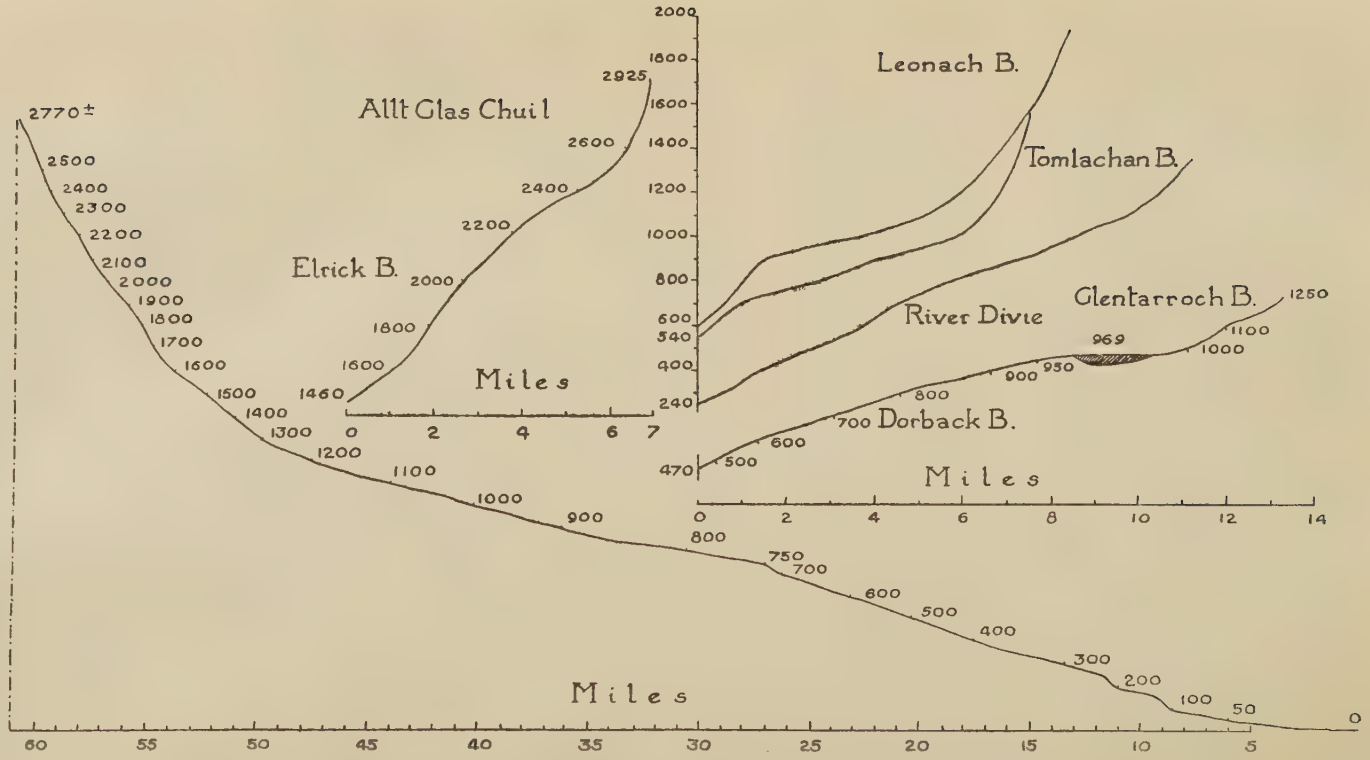


FIG. 5. Longitudinal profiles of the Findhorn and some of its tributaries (horizontal scale in miles and vertical scale in feet, as indicated).

feature at Knockando (cp. Figs. 3 (3) and 4 (4)). This is not what one would expect. If the Findhorn and Spey were rejuvenated by contemporary and approximately equal uplift, the more powerful river ought to have done the greater amount of work. The inner valley at Knockando is narrowed, though its depth is unaffected, by the river's failure to clear out all the glacial deposits that there encumbered its course. But, other considerations apart, it is to be remembered that capture of the Upper Findhorn would rejuvenate all the lower reaches of the river and be signalised by increased vertical erosion there, and by the production of valley-within-valley. One may, therefore, imagine two stages in the rejuvenation of the Middle and Lower Findhorn, not contemporary —capture came first—but close enough in time to produce cumulative effects. Hence the large size of the inner valley, the outer valley being of precapture age.

The argument in favour of rejuvenation of the Findhorn is reinforced by study of the profiles of the Divie and Dorback, which also cross the axis of the uplift. On these streams a break in the gradient occurs where theory leads one to expect it (Fig. 5). The profile of the Upper Dorback has been affected by glacial deposition as well as by the glacial erosion that has produced the shallow rock basin in which Lochendorb partly lies.[1d, 6b]

In the form and extent of the uplifted area may be found an explanation of the fact that the piratical Middle and Lower Findhorn now has a longer course to the sea than its victim. If upheaval extended to the coastal area at the mouth of the Findhorn—as it probably did in the case of both Findhorn and Spey—but not to that at the mouth of the Nairn, the sea would retreat and the course of the Findhorn be lengthened.

Further, any uplift or upfold has, as a rule, adjacent to it a downfold. If the region round the mouth of the Nairn has subsided, the present abnormal relation of pirate and victim receives ready explanation. There is little to support this hypothesis beyond the deeply buried valley of the Ness at Inverness—of unknown date and depth.[1e]

III. The Middle Findhorn

Unlike the sections of the river above and below, the Middle Findhorn follows structural lines.

From Carnoch to a little above Dulsie the river keeps strictly to the strike of the micaceous schists and gneisses of the " Streens Ring," [1d] and its course is probably determined by the nature of these rocks (*vid. inf.*).

Above the bend between Carnoch and Drynachan the river again follows structural lines ; and its course has been in some measure determined by, though it does not strictly follow, the faults and shatter-belts shown on the geological map (Sheet 84). It seems

likely, indeed, that a sheet of Old Red Sandstone, part of which has been preserved by being trough-faulted into the schists, may have been the main factor in guiding the headward erosion of the growing stream.

Between Polochaig and Drynachan there is a fine display, chiefly on the right bank, of tiers of alluvial terraces merging upwards into fluvioglacial terraces (=washed lateral moraines). It is often difficult to decide to which class a particular one of the higher terraces belongs.

From Carnoch to below Banchor high-level terraces are absent. But where the river enters the area covered by thick fluvioglacial gravels that continue down the Lower Findhorn, high-level terraces begin—the fluvioglacial here 150 feet, and the highest alluvial 100 feet, above the river.

The Carnoch Burn.—"It is evident that the upper part of the Carnoch Burn originally formed the head waters of Allt na Leacain with a gentle northerly gradient. But the lower portion of the Carnoch Burn, with its short southerly course of a mile and a half and a fall of about two hundred and fifty feet in that distance, cut backwards rapidly and tapped these waters above the col." [1d] From the supposed elbow of capture the 900-feet contour on Allt na Leacain is distant, in an air line, 1 mile : the same contour in the lower Carnach is 1·25 distant. By the law of unequal slopes the advantage lay with Allt na Leacain, though in the last half-mile or so the Carnoch drops 188 feet through a narrow rock gorge, the head of which is steadily receding upstream. The more likely interpretation is that this is a case not of river capture but of glacial diversion, and that the Carnoch from the elbow at 1000 feet was initiated as a meltwater channel. In any case the valley of the Carnoch is an ideal example of a hanging valley.

IV. The Lower Findhorn to Cothall—Glacial Lakes

It has already been noted that the valley from Dulsie to Sluie is encumbered with glacial debris, much of which takes the form of fluvioglacial and morainic gravels. Out of these have been carved the river terraces that rise to surprising heights—up to 200 feet—above the level of the river. In these respects there is close similarity to the corresponding features on the Lower Spey.

On the right bank of the river, above the belt of alluvial terraces, a terrace feature (Fig. 6), in places obscured or destroyed by denudation, stretches from south of Ferness Village by Mills of Airdrie, and Airdrie, Relugas Cottage, Manse of Relugas, Easter Tillieglen and Ballencreich, till it merges into the outwash gravels that fringe the valley of the Dorback Burn. The composition of this terrace is revealed in many sections, large and small : the best are near Mills of Airdrie and below Bridge of Ess (Dorback Burn). A spread of gravel, usually thin, forms the surface ; and below it

is a varying thickness of fine, evenly bedded sands and silts. In the valley of the Divie denudation has obscured the terrace, but sections disclose the fine sands and silts characteristic of it. Clearly the terrace is composed of materials deposited in the still waters of a lake which was gradually quite, or nearly, filled up.

The lake terrace passes southward into fluvioglacial gravels that slope gently upwards, outside the terraces, towards Dulsie. On the left side of the valley, too, fluvioglacial gravels form a rude terrace above the alluvial strip. Followed from above Dulsie it sinks in level and merges, towards Ardclach, into the tumbled moundy area around Loch Belivat.

Loch Belivat lies in a gap, south of the Lethen Bar ridge, that drains westward to the Muckle Burn. The floor of the gap sinks below 500 feet and is cumbered with mounds and sheets of gravel and sand.

The lake terrace has been clearly recognised as such only on the right side of the valley. The ice-dam that impounded the lake probably spanned the valley from Dounduff to near Dunphail station, where mounds and short ridges suggest a lateral moraine of ice occupying the lower ground to the north. Eastward the ice barrier passed by Drumine Forest to Craigroy (the more southerly of two Craigroys), and beyond : its course can be traced along the north face of the higher ground of Drumine Forest by a rude terrace—a washed lateral moraine or "kame terrace" of some writers. The lake no doubt discharged (*a*) by subglacial channels, and (*b*) along the edge of the ice and through the Romach Overflow Channel, partly cut by meltwater at an earlier stage in the retreat of the ice.[4b] The gap at Dunphail station (620 feet) seems to have served as an outlet by which discharge from the lake reached the ice margin.

But ice also occupied the Belivat gap : it discharged meltwater and outwash into, and helped to hold up, the glacial lake.

The manner in which the glacial lake came into being may be explained as follows. During the waning of the Third Ice-sheet the mass of high ground culminating in Càrn nan tri-tighearnan divided the flow emanating from the Great Glen and the Nairn and Upper Findhorn valleys. The main stream merged with the Moray Firth Ice-lobe, M, streamed along the north flank of the high ground and crossed the Lower Findhorn : the rest, N, mainly Nairn and Findhorn ice, followed the south flank and passed across and along the Middle Findhorn basin. At first the high ground formed a nunatak ; but by and by, as the ice shrank, the front of N retired towards the bend of the river at Dulsie and parted company with M. While the front of the Moray Firth Ice-lobe retreated westward in the coastal strip, its inland margin was retiring northward and encroaching less and less upon the land. When its inland margin stood in the neighbourhood of Dounduff and Dunphail, it still pushed a lobe through the Belivat gap to the

brink of, and probably into, but not across, the Findhorn valley. A part of that valley became ice-free, and there the waters of the *Findhorn Glacial Lake* accumulated (Fig. 6). By a curious coincidence—there can be no causal connection—its shoreline lies at almost the same level as that of the Knockando Glacial Lake in the Spey valley—620 feet.[4b]

The precise level of the shoreline is not easy to fix, because of postglacial denudation. Nowhere can one detect a distinct " nip " or shore scarp.[4b] From south of Ferness Village to Mills of Airdrie, too, the sands and silts and particularly the gravels reach higher levels than elsewhere, because there the sediments carried into the lake by meltwater from the ice, N, and by the Tomnarroch and Fevene Burns were built into deltaic fans partly below and partly above water-level. The height of the outlet at Dunphail suggests a level for the lake of 620 feet.

The fluvioglacial gravels on the two sides of the river, from Ferness on the right and the Belivat gap on the left towards Dulsie, are the remnants of a valley-train of outwash, originally filling the valley from side to side. At its downstream end it formed, as just suggested, a delta at the head of the lake. It is difficult in the absence of good sections to say precisely where the purely glaciolacustrine deposits end and the glaciofluvial begin.

The gravels that cap the finer lake sediments were spread out as the waters of the lake became shallower by deposition of silts and sands.

The only indication of further impounding of water after the dissolution of the Findhorn Glacial Lake is seen in the horizontal terrace which, on the west side of the valley, extends northwards from Dounduff for over a mile. At Dounduff it is marked on the Geological Map (Sheet 84) as an alluvial terrace, the seventh and highest of a stepping series ; for the rest of its length (densely wooded), as the " [back] margin of an eroded terrace." At its northern end it is rather over 300 feet, at Dounduff 225-230 feet, above the river. Even for the Findhorn—and the Spey—300 feet would be an astounding height for an alluvial terrace ; and alluvial terraces, particularly along rivers of high gradient, are not horizontal.

Indications of the ice-dam that may have held up a glacial lake, of which the terrace described formed part of the shoreline, may be found in the short ridges and mounds south and north of Logie House : further east, however, it is difficult to locate the ice-margin along which the lake found outlet.

At later stages in the slow retreat of the ice down the Findhorn there was no further formation of glacial lakes : the water found free outlet eastwards along the ice-margin. In doing so it spread out, at lower and lower levels, lateral moraine terraces. These are nearly at right-angles to the river and could never have been formed by water passing freely down the valley (Fig. 6). The

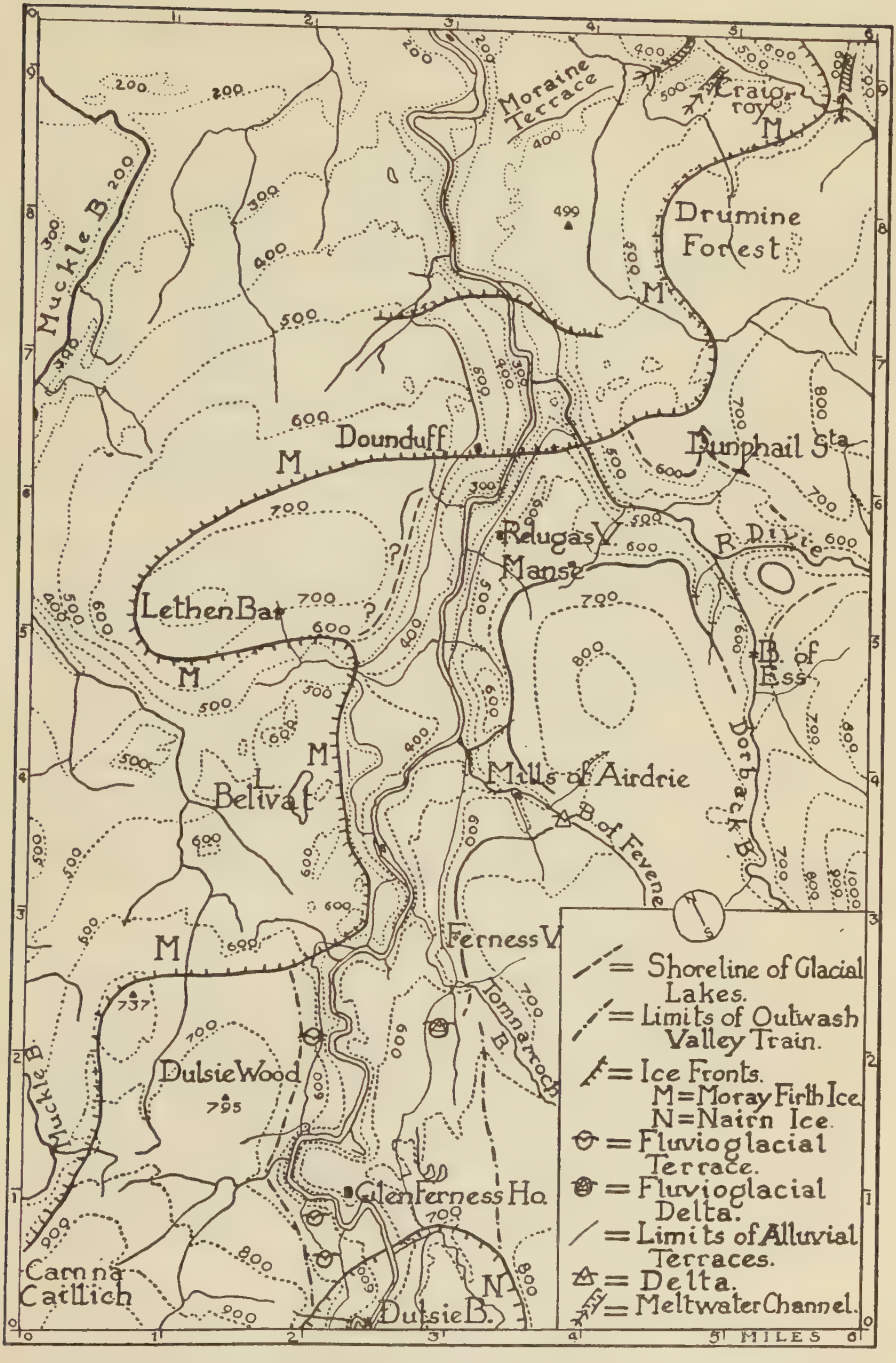


FIG. 6. The Lower Findhorn.

mapping—and even the identification—of these terraces in thickly wooded country is no easy task.

V. The Muckle Burn

The longest tributary of the Findhorn—if it be called a tributary rather than a twin river—is the Muckle Burn. It may be suggested that the original source of this stream was on the ridge connecting Càrn Kincraig with Càrn Torr Mheadhoin. Flowing along the lines of fault or on Old Red Sandstone, it began the excavation of the Streens, followed in reverse direction the present line of the Carnoch Burn, and passed through the wide depression between Càrn a' Chrasgie and Càrn Sgumain (Fig. 3 (4)). The Leonach Burn then formed the main headstream of the Lower Findhorn ; and a tributary, thrown out to the west along the micaceous schists of the " Streens Ring," or perhaps along a belt of Old Red Sandstone filling a pre-Old Red valley, captured the stretch of the Muckle Burn above Carnoch.

The Riereach Burn, a tributary of the Nairn, flows northward parallel to the Muckle Burn. From the 1000-feet contour down, the watershed lies close to the right bank of the Riereach, and small streams which ultimately swell the Muckle Burn flow eastward at right-angles to the general slope of the ground. More or less of the present valleys of these streams has been utilised—and some may have originated—as meltwater channels while the margin of the Moray Firth ice was gradually retiring northward down the slope. To the north-west of Clunas a small stream rises at the mouth, and continues the direction, of a west-to-east dry valley or meltwater channel. A rather striking example of eastward diversion of drainage is furnished by the streamlet immediately south of Càrn Maol.

VI. The Dorback Burn. Pitted Outwash Plain

The Dava-Nairn road skirts the southern, the Dorback Burn the eastern, margin of a nearly level plain of sand and gravel, pitted with hollows, twenty-eight of which hold water at all seasons. In every opening, large and small, in this area, erratics of Nairnside Old Red Sandstone are found ; they become more numerous towards Dulsie Bridge.[4b] The plain was evidently formed by outwash from ice retreating W.S.W. towards its sources in the Great Glen and Nairnside.[1d] The hollows are kettle-holes ; and the sand and gravel area, measuring over a mile square, is a fine example of a pitted outwash plain.

VII. The Lower Findhorn from Cothall to the Sea

Issuing from the sandstone gorge at the famous old Cothall Quarries, 0·7 mile south of Mundole, the river enters on an area—

the Plain of Forres—once the bed of the Hundred Feet Raised Beach Sea. The old sea-margin can be traced from Cothall to Forres on the east, and at intervals towards and beyond the Muckle Burn on the west. The Twenty-five Feet Beach is seen in Forres—part of the town stands on it ; and most of the Culbin Sands rests upon it.

Many changes have occurred at the mouth of the river. Before 1690 the Findhorn turned westward just north of Binsness, flowed south-of-west for some five miles, and discharged into the sea behind " The Bar "—of shingle and sand—perhaps opposite Maviston.[4a] The town and port of Findhorn (originally " Invererne ") then stood on the north side of this stretch, some four to five miles from its mouth. About 1690 the channel of the river was blocked by the drift of sand from the west and a new outlet was established very near where the river still enters the sea. A second Findhorn, built on the east side of Findhorn Bay, succumbed to the combined attack of river, sea and sand ; and the villagers moved about a mile southward to a third Findhorn, the present village.

The Culbin Sands.—Findhorn is a picturesque and comparatively secluded old-world village, a charming place for visitors who like a boating, bathing or fishing holiday. The only town-planning in evidence is that, unless protected by other buildings, every house turns its back to sea and wind-driven sand. It is built on sand, and sand during a strong westerly gale is everywhere.

On his first visit to the village the visitor who has previously read up the literature of the Culbin Sands will be surprised to find, on walking north over ridges of blown sand to the open coast, that the actual beach is formed not of sand but of shingle. A short search reveals large numbers of pebbles from the Permo-triassic rocks of Burghead, Hopeman and Covesea, a few of the cherty rock of Stotfield near Lossiemouth, and many more that *might* have come from still further east. This seems to dispose one to modify the theory that the main source of materials for the age-long growth of the Culbin Sands is " the enormous quantity of sand carried now and since glacial times into the sea by the Findhorn. When this sediment is discharged into the sea it is borne steadily westwards and south-westwards by the currents along the shore [tidal currents], and is eventually deposited on the shelving beach [towards Nairn] by tidal action. It is then caught by the [prevailing westerly] winds and carried inland in an easterly direction." [1d] From the composition of the Findhorn beach it is evident that part—and probably a large part—of the supply of sand is drawn from sources much further east than the Findhorn. Examination of The Bar, four to eight miles west of the Findhorn, would doubtless show that it is of the same composition as the pebble beach just described. Attrition readily breaks down the Permo-triassic sandstones, particularly when they are wet, into their constituent sand grains. The drift of sand and shingle from the east is at present

pushing the mouth of the Findhorn towards the west, and must have been the main factor in producing a similar but more striking result in the past.[3a, b]

Gradient of the Findhorn

Feet.	Miles.
0-50	6·00
50-100	2·65
100-200	2·70
200-300	2·30
300-400	3·95
400-500	2·80
500-600	2·70
600-700	3·17
700-800	4·45
800-900	5·50
900-1000	4·10
1000-1100	3·80
1100-1200	3·76
1200-1300	2·00
1300-1400	1·26
1400-1500	1·26
1500-1600	1·55
1600-1700	0·85
1700-1800	0·50
1800-1900	0·65
1900-2000	1·00
2000-2100	0·70
2100-2200	0·50
2200-2300	0·80
2300-2400	0·60
2400-2500	0·30
2500-2720	1·30
Total length=	61·16

Contrasts in Gradient

Between 100′ and 50′ (2·65 miles) the gradient is 18·8′ per mile.
„ 750′ and 100′ (18·37 „) „ „ 35·3′ „
„ 850′ and 750′ (7·00 „) „ „ 14·3′ „
„ 1150′ and 850′ (19·80 „) „ „ 20·2′ „

BIBLIOGRAPHY

[1] *Memoirs* of the Geological Survey, Scotland : Explanation of Sheets (*a*) 64, (*b*) 74, pp. 3, 56, (*c*) 83, pp. 82-3, (*d*) 84, pp. 8-9, 11, 9, 10, 30, 10, 104, 110.

[2] *Scottish Geographical Magazine :* (*a*) XVI, April 1901—" The River Spey," L. W. Hinxman ; (*b*) XXXI, November 1913—" Capture of the Geldie by the Feshie," A. Bremner.

[3] *Transactions of Inverness Scientific Society and Field Club :* (*a*) II, pp. 114-119, 113, 387-9 ; (*b*) V, pp. 307, 308, 105-112.

[4] *Transactions of Edinburgh Geological Society :* (*a*) V, pp. 524 *et seq.*—G. Craig (Mr. Craig's map of the old course of the Findhorn does not agree with his text : the latter is correct) ; (*b*) XII, Part I, pp. 17-47—" The Glaciation of Moray," A. Bremner, pp. 21, 36, fig. 3, fig. 1, pp. 26-9, 21.

[5] *Publications of Aberdeen Natural History and Antiquarian Society :* No. 2—" The Physical Geology of the Don Basin," A. Bremner, pp. 8-13, 7.

[6] *Bathymetrical Survey of Scottish Freshwater Lochs :* (*a*) I, pp. XXXI, 506 ; (*b*) II, Part II, p. 164 (description), p. 164 ; (*c*) V, Plates LXII and LXIII.

[7] Bain, G. : (*a*) *The Deveron from Source to Sea* (descriptive and historical) ; (*b*) *The Culbin Sands* (descriptive and historical). Both issued by " Nairnshire Telegraph," Nairn.

[8] Henderson, T. M., *The Deveron, The River of Beauty* (descriptive and historical).

[9] Lauder, Sir T. Dick, " *The Moray Floods* " *of 1829.* Ed. 1873.

PROBLEMS OF PALESTINE

By K. H. Huggins, B.Sc.

The problems of Palestine which have occupied such a considerable space in the daily press in recent times have been discussed in terms of politics : the importance of the Near East to Imperial communications, the relations of Palestine to the Arab states of the Near East, the working of the mandate and the political relations of Arabs and Jews in Palestine, and finally the problems of restoring at least superficial peace. Many of them have been given an apparent urgency, often artificially induced by the pressure of local disturbance, and in the search for quick solutions expediency has often been preferred to considerations of ultimate benefit and lasting stability. Questions have been hastily considered under a barrage of press propaganda from interested parties. Under these circumstances even Royal Commissions have not escaped the attraction of facile solutions which have proved on more mature consideration to be unworkable.

It is not the purpose of the present article to consider the immediate political problems, but to examine the conditions which lie at the root of these problems by surveying the major changes which have taken place in Palestine since the end of the War, particularly the changes in the number and composition of the population, and those in agriculture, industry and transport.

The fundamental cause of many of the problems of Palestine is that the population has almost doubled in less than twenty years. There can be few countries in history in which this has happened at all, let alone in a country in which for the previous two hundred years the population had remained more or less stable. This increase of population and the problems arising from it are popularly attributed entirely to Jewish immigration, although the most superficial consideration of the facts shows that this is not the case. The increase and change in composition of the population between

the first Census under the British Administration in 1922, and the estimated population in July 1938, are shown in Fig. 1. It will be seen that out of the total population of about three-quarters of a million in 1922 only 84,000 were Jews, and that by 1938, when the total population was 1,400,000, the Arab population had grown from 670,000 to almost a million, mainly by natural increase, whilst the Jewish population had increased mainly by immigration to about 400,000, or 28 per cent. of the present total. The problem of Jewish immigration has come as an additional complication during a period of rapid increase in the Arab population.

This rapid increase of the Arab population has been attributed to the cessation of the removal of young men by Turkish conscription, and to various improvements of hygiene. Emigration to the United States has also been stopped. The official figures show that over the last fifteen years the vital statistics of the Arab population have been : births 50 per thousand, deaths 25 per thousand, and a net increase of 25 per thousand, or 2·5 per cent. per year ; a phenomenal figure.

The increase of the Jewish population has been due predominantly to immigration. The recorded immigration since 1922 is about 300,000, an average of a little over 16,000 a year, but the

Fig. 1. Population of Palestine in 1922 and 1928.

fluctuations from year to year have been very great, and much political capital has been made out of the heavy immigration in certain years (Fig. 2). There have also been important changes in the countries from which the immigrants came and in the type of immigrant.

The Jews of Europe, as a result of historical migrations and persecutions in Western Europe, are most numerous in Poland and the western fringe of Russia. The immigrants of the early years came largely from these two countries, and it was not until after 1933 and the advent of the new regime in Germany that large numbers of Jews from Western Europe began to migrate to Palestine. Between 1919 and 1928, 100,000 Jews entered the country ; 41,000 from Poland, 27,000 from Russia and only 1000 from Germany. Since 1926 there have been scarcely any immigrants from Russia. Even as late as 1932 there were only 1000 immigrants from Germany, but in 1933 there were 5400, and since then 26·6 per cent. of the available immigration permits have been allotted by the Jewish Agency to German Jews. Since 1937 immigration has been greatly restricted. The Peel Commission recommended a " political high level " of 12,000 immigrants a year. In 1937 there were only 10,536, and the quota for the twelve months ending March 31st, 1939, is 7870.

Thus the increase of population in Palestine has not been the result of developments which called for an increased supply of labour, but, in the case of the Arabs, by an alteration in conditions upsetting the previous equilibrium of population, and in the case of the Jews, by migration from countries where conditions had become intolerable to a promised land where new means of support had to be found.

It is now time to consider the nature of the country in which these changes took place. The smallness of Palestine has frequently been emphasised. Its total area is about 10,000 square miles, or almost exactly one-third that of Scotland. Of this small area half is desert, and the size of the habitable part will perhaps better be realised from the facts that from the northern frontier to Hebron is 135 miles and from Jaffa to Jerusalem is 35 miles.

The chief regions of the country are shown in the map (Fig. 3). It will be seen that apart from the desert, which occupies the

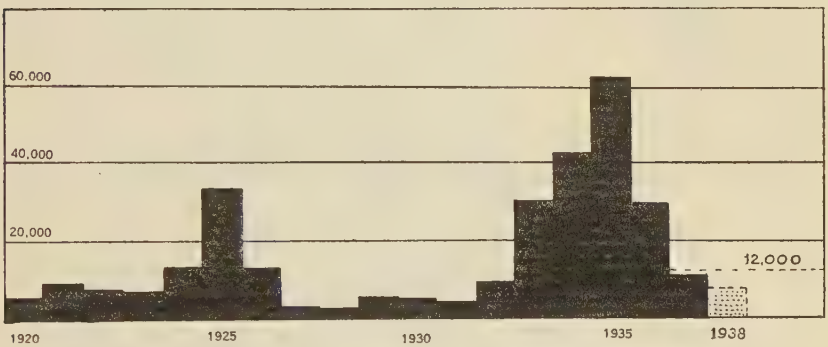


Fig. 2. Annual Jewish immigration into Palestine since 1920.

southern half of the country, the southern Jordan valley and the eastern fringe of the Judaean plateau, the country can be divided into the plains and the central upland; the areas of these three parts are respectively 5200, 2800 and 2200 square miles. A detailed description of the character of the different regions was given by Mr. Cust in a recent number of this Magazine (vol. 53, November 1937). No further description need be given here.

The desert part of the country is inhabited only by the nomadic bedouin tribes, and although it amounts to half the area, the total number of inhabitants is about 55,000, less than 5 per cent. of the present total, and only about 10 per square mile. It is probable that the number has not changed greatly in the last twenty years, although the estimate of the 1931 Census was lower than that of 1922.

In the Beersheba district, where the soil is good, some land is cultivated although the rainfall is so low and so irregular that in only two years out of seven is there a good harvest, and in two years the crops fail completely. Apart from this gamble on the rainfall,

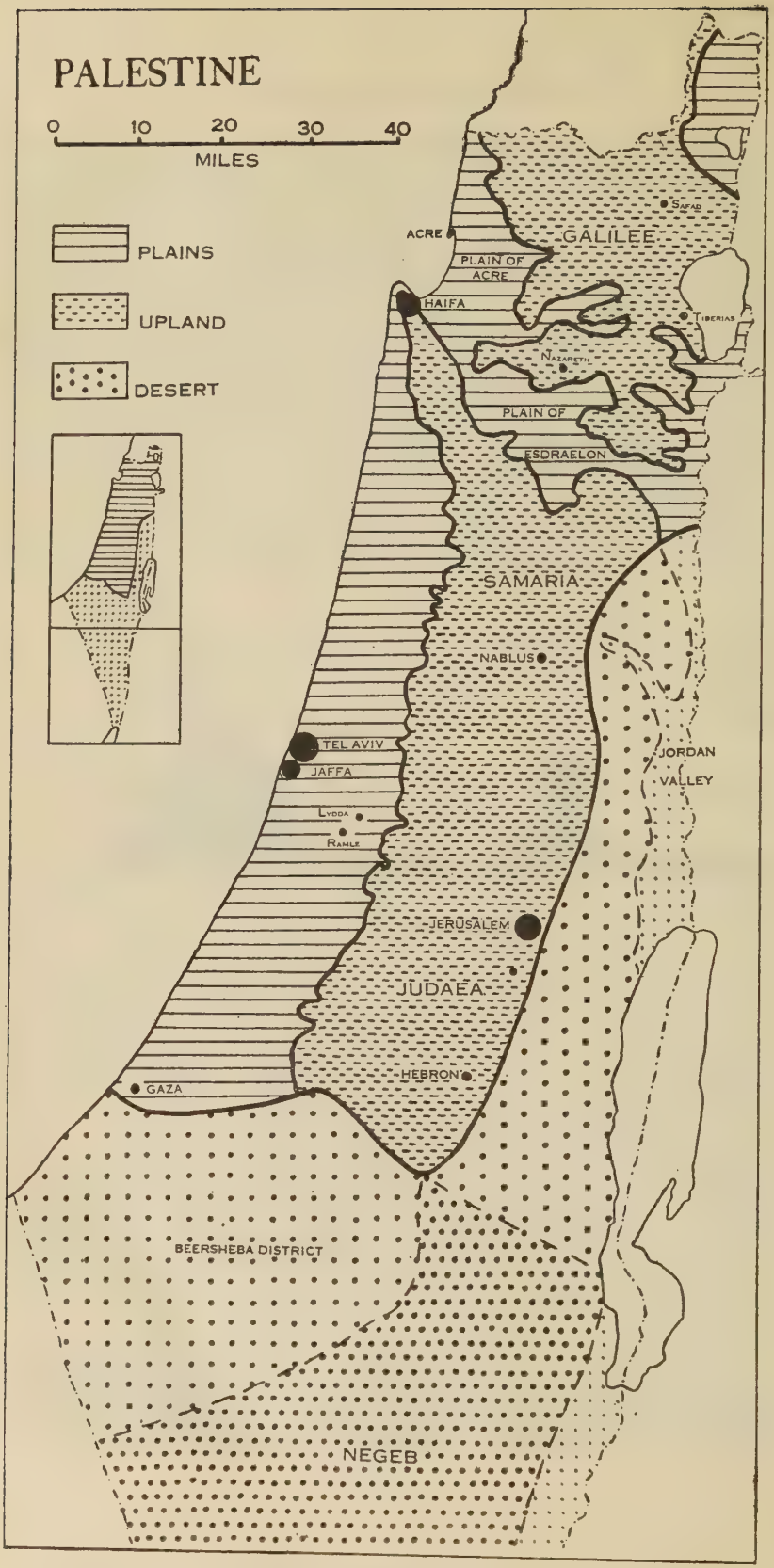

PALESTINE
0 10 20 30 40
MILES
PLAINS
UPLAND
DESERT
SAFAD
ACRE
GALILEE
PLAIN OF ACRE
HAIFA
TIBERIAS
NAZARETH
PLAIN OF ESDRAELON
SAMARIA
NABLUS
TEL AVIV
JAFFA
JORDAN VALLEY
LYDDA
RAMLE
JERUSALEM
JUDAEA
HEBRON
GAZA
BEERSHEBA DISTRICT
NEGEB

Fig. 3.

the nomads depend on their herds of camels. In the summer months, when the pastures of the south are dried up, they move to the northern parts of Palestine where they have traditional rights of grazing on the wastelands, the fallows and the stubble of the crops. This migration has always been accompanied by friction between the nomads and the settled cultivators, and such friction has become more severe in places where the settled population is not Arab and the new methods of agriculture leave no room for pasture.

At least 90 per cent. of the population of Palestine has always been concentrated in the other two regions : the uplands and the plains.

Until after the War, farming was carried on chiefly by the traditional Arab methods. On the thin soil of the stony terraces of the arid limestone uplands, the Arab peasantry cultivated winter

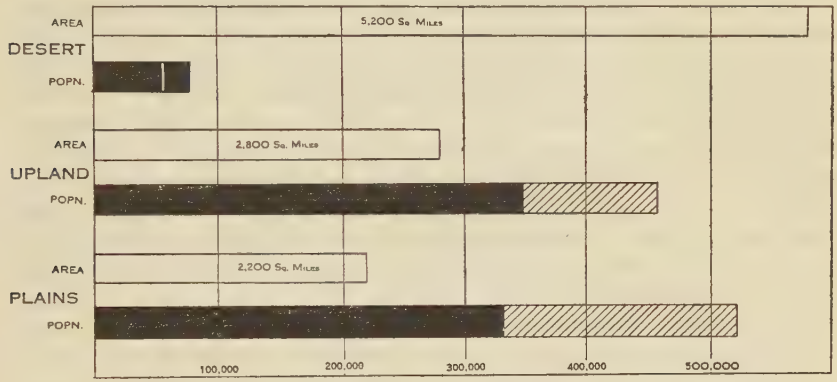


Fig. 4. Areas of the Major Regions of Palestine and their populations in 1922 (solid) and 1938 (hatched).

crops of wheat and barley and summer crops of millet, and supplemented these with olive trees, almond trees and vines, which thrive on even stonier land than the grain crops.

In relation to their potentialities the plains were not so well cultivated. Large parts of them were flooded in winter, and marshy and malarial in summer. Villages were more common at the edge of the hills than in the plains, and many of the smaller plains were used as supplementary areas by the hill villages and were not independent areas of settlement. The drier parts were used as summer pasture, or cultivated for summer crops, but there were few olive trees or fruit trees, and only a few patches of orange grove and vineyard as fore-runners of the change that was to come. Even in 1922 there were more people living in the uplands than in the plains (Fig. 4).

The change in the value of the plains has been the result of the introduction of entirely different systems of cultivation, especially the intensive cultivation of orange trees, which need irrigation.

High returns can only be obtained after the expenditure of a large amount of capital on providing irrigation facilities and in planting the trees and caring for them until they reach maturity and begin to yield.

All the plains are not equally suitable for the cultivation of the orange. The most suitable area is the western half of the coastal plain from Mount Carmel in the north to a line about half-way between Jaffa and Gaza in the south. There the soil is light and sandy, and water can be obtained almost everywhere by pumping from wells at depths between 30 and 300 feet. In the other plains, Acre, Esdraelon and the upper Jordan valley, the soil is heavier and much less suited to the cultivation of oranges, although grapefruit thrive.

The reclamation of these plains has been largely the result of Jewish enterprise, indirectly as well as directly. The Jews converted areas of poor grain land, and completely waste land, into highly productive orange groves. This set an example, and at the same time the large sums of money they paid for the land provided the Arab landowners with the capital necessary for the conversion of the lands they retained for themselves, so that approximately one-half the present area of orange groves is owned by Jews and one-half by Arabs. The total area of orange groves is quite small, only about 120 square miles. Although one expert believes that there are another 80 square miles of suitable land, the problem of finding markets for the present production, which was 12 million cases in the 1937-38 season, is sufficient to discourage any large extension in the immediate future.

The Jewish settlements in the northern plains are not based on the cultivation of oranges, but on the production of grain, fodder and cattle. Although by improved methods they have greatly increased the output of these areas, the economic basis of this intensification is more doubtful.

The increase of output has led to much discussion of what is called the "lot viable," the amount of land necessary to support a family at a reasonable standard. The idea is simple, but in practice its application involves great difficulties with unknown and variable factors : the character of the land, the system of farming, the price of crops and the definition of a reasonable standard of living. The confusion has been enhanced by the fact that some of the estimates have not been made disinterestedly, but with the object of justifying or opposing immigration. For the present purpose it is best not to enter into such theoretical and controversial considerations, but to study the actual conditions and recent changes.

In the uplands the Arab peasant population had apparently been fairly stable for two hundred years. In these areas, as elsewhere, the population has been increasing rapidly since the War.

To maintain even the poor standard of living to which the Arab

peasantry are accustomed it is necessary either to extend the area of cultivation or to increase the yield from the area at present cultivated. Neither of these things has in fact been done, and it is difficult to believe that they could be done on any significant scale. Almost every patch of soil, however stony, is cultivated, and even the steepest and rockiest slopes are terraced to retain the soil for olives and other tree crops. The hills are not suitable for the cultivation of oranges and there is no water available for the irrigation of this or any other crop. The few small Jewish settlements that have been established in the hills have only 4100 inhabitants. They have been based on a highly artificial system of dairying to supply the Jerusalem market, and apart from the inherent difficulties the scope for this is very limited.

Consequently, without any significant Jewish immigration into the rural areas, the Arab peasantry of the hill districts, who number 355,000, are suffering from the results of an increase of population in relation to the productive resources of the land. Even those families which retain their original holdings are becoming more and more dependent on income from casual labour to keep going. Almost all of them are deeply in debt to money-lenders, and there has been a steady transfer of land from peasant ownership into the hands of Arab capitalists. There has also been an increase of the landless class entirely dependent on earnings.

In the plains conditions have been quite different. There, considerable areas of land have been bought by Jews. The extent to which this has involved the displacement of Arabs is a matter of dispute, but it is probably not large. There has been a compensating advantage in the increase of employment, which is not confined to the Arab orange groves, and there is no doubt that seasonal earnings during the orange harvest in the plains provide an important supplementary source of income for many Arabs, from the hills as well as from the plain.

Jewish immigration has been opposed mainly on the ground that the best land of the country is being taken away from the Arabs. The total area of the Jewish land holdings is not large, 500 square miles, and although most of it is in the plains—the only areas of deep soil—even there two-thirds of the land still belongs to the Arabs. Most of the land was in very poor condition, if not completely waste, when bought by the Jews, and it has attained its present high value as a result of the capital and effort invested in it by them. It is admitted that the price paid for the land was in most cases far above its economic value, but it is unfortunate that the advantages of such sales accrued to a few landlords, some of them not even resident in Palestine, whilst the inevitable hardships fell on the tenants, many of whom do not believe that the landlords have any real right to sell the land over their heads.

Jewish immigration has been considered in terms of land settlement. As a consequence, much discussion has taken place on the

possibilities of settlement in such marginal areas as the Beersheba district, and the Jordan valley. Fantastic figures have been suggested. In cold fact intensive efforts to find water in the Beersheba district have failed almost completely, and the extension of irrigation in the Jordan valley would involve enormous expense for very little result.

It is highly improbable that those areas will ever carry a population much larger than they do at present. Whether that is a sound judgement or not is, however, immaterial, for land settlement plays only a minor part in Jewish immigration. Of the 400,000 Jews in Palestine, less than 60,000 (15 per cent.) are in the agricultural settlements, and of the 173,000 immigrants in 1932-36, only 29,000 went on to the land. The Jewish Problem in Palestine is essentially an urban problem, and it is a problem that will gravely trouble the Jews themselves.

The changes in the towns of Palestine have been even greater than those in the rural areas. The number of people living in the four chief towns is over three times as great as it was in 1922 ; then Jerusalem, Haifa, Jaffa and the satellite Tel Aviv, together contained only 135,000 inhabitants, or 18 per cent. of the population. In 1938 Tel Aviv alone had 140,000 inhabitants and the four towns were estimated to contain 450,000 people, or 32 per cent. of the much larger total. There are other considerable changes. Tel Aviv, which was not recognised as a separate entity in 1922, has now more people than any other town in Palestine. Haifa has considerably outstripped Jaffa, which is the only one of the four large towns that still has a predominantly Arab population. The relative size of these towns and the proportion of Jews and Arabs in them is shown in Fig. 5.

This increase in the size of the four large towns is not wholly a reflection of economic changes, but has been largely influenced by the immigration of Jews, 70 per cent. of whom live in these towns.

These changes must be viewed in relation to the pre-existing conditions. Palestine is predominantly a land of village dwellers, and most of the villages are small. A few, Safad, Tiberias, Nazareth, Lydda, Ramle and Bethlehem, have between six and twelve thousand inhabitants but are still essentially villages ; the old and decayed port of Acre, shut up inside its enormous ramparts, is no larger than these villages. Apart from the big four there are only three real towns in Palestine, each with slightly under 20,000 inhabitants. They are Gaza, on the ancient route to Egypt, and still an important market for the bedouin of Sinai and the south-west ; Hebron, the market for the bedouin of the south, and Nablus, the chief market of Samaria. Nablus is the centre to which surplus olive oil is taken to be made into soap in small factories. These three towns are almost completely Arab, and still in close contact with the surrounding countryside. They have each a few small-

scale traditional crafts and industries, but are still essentially markets, unaltered and unaffected by most modern developments. The important changes have been confined to the four large towns.

Jaffa has changed least. It is the ancient port of Judaea, and is situated where a line of low reefs gives inadequate shelter on an otherwise unbroken sand-dune coast. The harbour is inaccessible for even the moderate-sized ships that handle the orange exports, and they have to anchor almost a mile out. For long periods in the stormy winter months the slow and complicated business of transferring goods and passengers between ship and shore by lighter is impracticable. In spite of these handicaps it was until recently the best and most important port in Palestine, and it still handles, by its inefficient methods, a fair proportion of the orange export. Its growth has not been spectacular and it remains almost entirely

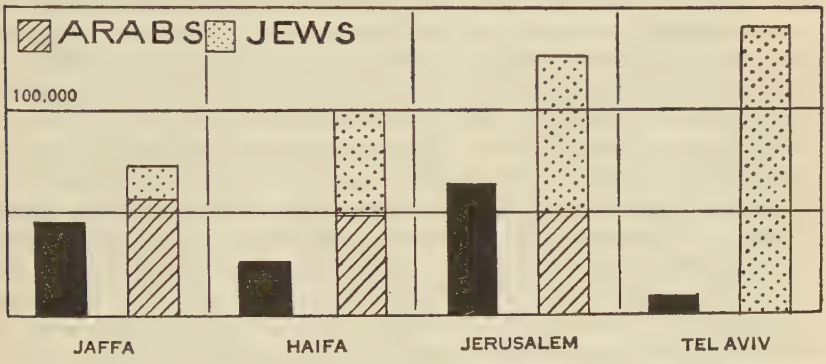


FIG. 5. Population of the four chief towns of Palestine in 1922 and 1938. Population of 1922 shown in black.

Arab in population. Its most important although not its most immediate rival is Haifa.

The other ancient port of Palestine was Acre. At the northern end of the Bay of Acre a small promontory gave some slight shelter and was an easily fortifiable site. So long as defence was a fundamental necessity, as it was in this land constantly exposed to invasion, Acre was the port for the routes reaching the coast through the plain of Esdraelon. It was used in turn by the Crusaders and the Venetians and was besieged by Napoleon and the Egyptians. Even as late as 1909, when the narrow-gauge Hedjaz railway was built from Haifa, through the plain of Esdraelon and up the Yarmuk valley to connect with the great pilgrim railway from Damascus to Medina, the branch from Acre was a very important tributary feeder.

As a site for the development of a large modern port, however, Acre is inferior to Haifa on the southern side of the bay, where below the high ridge of Mount Carmel there is deep water naturally sheltered on all sides except the north. A mile-long breakwater,

completed in 1933, provides protection from this side and a large space of water is thus enclosed. Along the landward side new quays have been built, at which the largest steamers using the Mediterranean can tie up. Behind the quays on reclaimed land there are modern transfer sheds, railway sidings and a magnificent street of shops and offices, the Kingsway. This new harbour is used by the weekly Italian steamers which maintain the regular service via Cyprus to Brindisi, Trieste and the rest of Europe. The water of the harbour is so sheltered that it is used as a landing-place for the Italian *Ala Littoria* sea-planes, which maintain the fastest air connection to Europe with services three times a week.

Haifa's communications inland have been improved since the War. The normal gauge railway from Kantara has been extended right through the plain as far as Haifa, and more recently a main road has been built through the plain to Tel Aviv and Jaffa. As a result Haifa is attracting an increasing share of the orange exports from the plain, and handles the bulk of the miscellaneous imports and exports of the country as well as monopolising the passenger traffic.

All this development, which has been accompanied by a rapid growth in population, has been independent of the building of the oil pipe-line across the desert from Iraq to the shores of Acre Bay, where the terminal and storage tanks stand some three miles north of Haifa. At present the crude oil is pumped out, through flexible pipes under the sea, to tankers which anchor at buoys nearly two miles out in the bay. A scheme for a giant refinery has been projected but not yet carried out, so that the petrol consumed in Palestine is still imported in a refined state by the two great rival companies Socony (Standard Oil Co. of New York) and Shell ; the only direct influence on Haifa has been the work provided by the administrative offices of the I.P.C. (Iraq Petroleum Company) in the town, and in the repair and maintenance departments at the terminal.

In addition to the actual work of the port, the town has become the business and administrative centre for the northern part of the country and has the most solid economic basis and the brightest prospects of all the towns in Palestine. There are beginnings of industrial development. Beside the harbour rise the gigantic storage elevators of a flour milling company which grinds imported wheat. There are mills where olives and oil seeds are crushed, two cigarette factories, the repair shops of the Palestine Railways, and a large power station. A few miles east of the town, at the northern foot of Mount Carmel, which provides limestone, and at the edge of the plain of the Kishon, which provides clay, are the Nesher Cement Works, which produce the raw material from which new towns are built.

The " old city " of Jerusalem, a holy city to three great religious communities, is not to be accounted for in terms of economic geography. Sir George Adam Smith has sensed and set down as

clearly as may be those intangibles which have attracted to it, and maintained within its walls, that medley of races, religions and languages, that mixture of the spiritual and the commercial, that make it unique among cities. But what of the new town that has grown up outside the city walls ? Before the War the chief buildings outside the walls were the Russian compound, for the crowds of pilgrims from that country, a few alms-houses for aged Jews, and two short streets of shops from the Jaffa Gate to the Post Office. Beyond this to the west there are now the main streets of modern offices and shops, and the new residential quarters. The modern Jerusalem is the administrative and business centre of Palestine, but the number of people living there seems in excess of the number necessary to perform those functions, and there are no industries to provide employment.

The importance of the problem of the future economic basis of these new settlements is seen still more clearly in the case of the mushroom town Tel Aviv, the pride of World Jewry. It is essential to remember that Tel Aviv was first planned as a residential suburb of Jaffa and bears still the marks of this, although it has grown to twice the size of the older town. It is still oriented towards Jaffa and has no focus of its own. The main street, Allenby Street, runs off towards the sea at right-angles to the main road from Jaffa. But the town turns its back on the sea, although there is a partly-developed promenade. There is still no proper passenger station, just a low platform by a level crossing. This matters little, since the railways are relatively unimportant in Palestine to-day. On the other hand there is a large modern aerodrome.

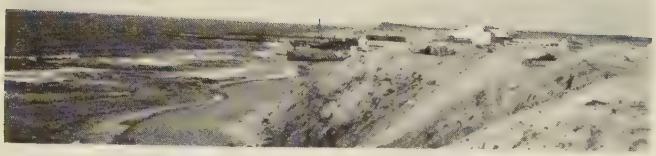
As friction between Tel Aviv and Jaffa has increased there has been much talk of the port of Tel Aviv. As at Jaffa the ships have to anchor far off-shore, but two small quays have been built at right-angles to the coast to provide some shelter for the barges by means of which goods are transferred between ship and shore. Small motor tugs tow two or three barges at a time backwards and forwards, but in spite of this slight improvement (the lighters of Jaffa are propelled by sails or oars) the roadstead of Tel Aviv suffers from essentially the same disadvantages as that of Jaffa.

The rate of growth of Tel Aviv is simply a reflection of the rate of Jewish immigration. Most of the immigrant Jews stay in the towns, the majority of them in Tel Aviv. Their personal problem is how to support themselves in this new country. A considerable proportion of them are trained in one of the professions. Many come to Palestine with capital from their previous homes, for the immigration regulations have always been more generous to people bringing a thousand pounds with them than to those with less capital. Some have enough to live on, others use their inadequate capital to open small shops. But of all the professional men few can earn a living, and of the shops few pay their way and the rest linger on until exhaustion of capital brings the inevitable bankruptcy.

An influx of capital and of highly trained people should provide a basis for industrial development. In so far as the local resources and the local demand are concerned, the scope is restricted. Palestine is practically without industrial raw materials or mineral resources. Two developments have attracted attention by virtue of the capital invested in them and the value of their output : the Palestine Potash Company, which extracts valuable minerals from the waters of the Dead Sea, and the Palestine Electricity Company, which has built a great power house to harness the waters of the Jordan and Yarmuk south of Lake Tiberias. Neither of these concerns employs, or is ever likely to employ, large numbers of people. Oranges provide raw material for factories making fruit drinks and essences. There is a local demand which provides a market for factories making cigarettes and chocolates, and, on a slightly larger scale, for foundries making wire fencing for the orange groves. There is obviously no real hope to be derived from the resources of the country or the home market.

But do these exhaust the possibilities of industrial development ? Palestine can never hope to compete in world markets with the established producers in any of the major industries, particularly in those in which the costs of raw materials, power or transport are important, or which are sheltered by tariffs in important consuming areas. There are, however, many small-scale industries in which none of these is important ; in which the chief factors in success are efficiency of management and skilled labour, and for the foundation of which large capital outlay is not necessary. The possibility of the growth of such industries has already been proved. The Royal Commission quotes, with some amazement, an excellent example—a small factory producing false teeth. This example seems ludicrous enough as the solution of the most important problem for the Jews of Palestine. Most other possible suggestions would seem equally inadequate in themselves, but cumulatively such unconsidered trifles might be built up, to provide a wide variety of minor industries for which the abilities and training of the people are specially suited. A community which based its prosperity on the skill and adaptability of its members might find in that a secure basis, and avoid the sudden fluctuations of fortune which afflict highly specialised towns which depend for their prosperity on one of the major industries in which competition is fiercest and the slumps deepest and most frequent.

The problem of finding a permanent economic basis for the town dwellers of modern Palestine ; one that will continue after the cessation of the abnormal conditions associated with expansion, a building boom and a heavy annual import of capital, is the most fundamental one to-day. It is more important both for the absorption of immigrants, and for the ultimate stability of the Jewish population in Palestine, than are the land-settlement schemes. It is not impossible that such industrial development by the Jews,



The "port" of Tel Aviv, March 1938.

The difficulty of upland agriculture : terraces at
Ain Karim, near Jerusalem.

Hebron, market for the bedouin of the south.

Small-holdings typical of Denmark.

The Stock Exchange, Copenhagen, built of brick in the seventeenth century and roofed with copper.

especially if it provided incidental employment for considerable numbers of Arabs, might offer just that obvious aspect of mutual benefit which is conspicuously absent from certain of the land-settlement schemes. Such a development might ultimately lead to a diminution of tension between Jews and Arabs, to a realisation that the two peoples could live amicably side by side, and to the ultimate settlement of outstanding political problems.

DENMARK TO-DAY

By Erik Schacke, Royal Danish Consul, and Society's Lecturer, February 1939

When as a boy or young man I read Scott's novels or otherwise heard of Scotland I saw it in my mind as that romantic country far up to the north on the top of England, so to speak, and I think that is how many Danes see it to-day ; while you in Scotland want to know if the winters in Denmark, that northern country, are not very cold. The fact is that both countries lie between about the same parallels of latitude, the 54th and the 58th. Edinburgh lies a trifle south of Copenhagen, while the most northerly point of Denmark, the Skaw, is right opposite the Moray Firth. The climate of Denmark is indeed a continental one, that is, a little warmer during those months we call summer and slightly colder during the real winter. There are many winters when Copenhagen has little snow and no outdoor skating, but now and then a winter sets in so severe that the Sound—the water between Copenhagen and Malmö—freezes and one can walk across to Sweden.

Denmark consists of the peninsula, Jutland, and over five hundred islands, of which, however, only about one hundred are inhabited. The Faroe Islands, situated to the north-west of Scotland, are a county of Denmark, while Greenland is her only colony. Iceland is since 1918 an independent kingdom in union with Denmark, the King of Denmark being also King of Iceland. The position in North Slesvig is of interest. In 1864 the Danes were badly defeated by Prussia and Austria, losing as a result not only the German Holstein but also the Danish Slesvig. It is true that at the instigation of the French Emperor Napoleon III provision was made in the treaty of Prague (after Austria's defeat by Prussia) for a plebiscite to be held in Slesvig. But no time-limit was specified and consequently no plebiscite would have taken place but for the insistence of the allies at the Treaty of Versailles. The plebiscite which took place in 1920 resulted in 75,431 Danish votes and 25,329 German, and the frontier was settled north of Flensborg. Nearly thirteen thousand Danes were left under German rule south of this

line. There is no town in North Slesvig with a German majority nor any district with an exclusively German population. Only in two small places is there a majority of Germans, the total majority amounting to 115. They are treated most liberally and have their own schools, churches and press.

In 1849 Denmark received a new, thoroughly modern and free Constitution, so liberal that except for the fact that it was remodelled in 1915 to include the enfranchisement of women, it is practically unchanged to-day. The Parliament consists of two chambers : a lower (*Folketing*) to which 149 members are elected on a proportional system with direct and secret ballot ; and a higher (*Landsting*) composed of 76 members elected indirectly. Important changes are under consideration, however. The electors—men and women of over twenty-three years of age—will elect 170 members to the Parliament. These will elect 34 of their own number and 34 others to be members of the *Rigsting*, to which also the *Lagting* of the Faroe Islands elects one member. The two chambers will be on entirely the same footing, and on certain occasions, such as that of the King's Speech, they will join to form a combined Parliament. An important proposal is intended to safeguard against the possibility of a Bill which has been passed by a majority in Parliament becoming law against the opinion of the country : an Act passed by Parliament must be confirmed by a plebiscite if 40 per cent. of the members of Parliament or one-third of these plus 15 per cent. of the electors demand it.

Denmark proper is a small country, 16,600 square miles, with a population of three-and-three-quarter million. Of the land, about four-fifths is agricultural while less than one-tenth is woodland and about 4 per cent. heath and moor. It has not always been so. It is only by a combination of science, energy and industry that much of the land, which was originally far from being suited to agriculture, has been turned into arable land, and that Danish agriculture has reached its present high standard.

At a time when attention is being given to the reclamation of heaths and moors in Scotland it may be of special interest to dwell on what has been achieved in this respect in Denmark. While about the middle of the eighteenth century more than half the total area of the country was lying idle, seventy-five years ago one-fifth, or about 3500 square miles, was still uncultivated, much the greater part being barren heath and waterlogged, sour moorland. In 1866 the Danish Heath Society was founded with the object of bringing just such land into cultivation. Members pay an annual subscription of five shillings only, but the Society has been endowed with a total of about £17,500 by private donors, and the Government has made grants, amounting last year to £45,000, for the different objects of the Society.

One absolute necessity for the cultivation of heath is an ample supply of marl or other material containing carbonic lime, and

millions of tons of it have been transported, at first in wagons pulled by oxen and later by means of lorries and railways. In 1938 alone one-and-a-half million tons of marl were distributed. It is a matter of course that during the last century the work was very much harder than it is to-day, with improved implements, and it used to be usual for five years to elapse between the breaking up of a heath and the sowing of the first seed. It now takes only one year. Men who tackle such work deserve some recompense, and a subsidiary society was formed in 1906 in order to grant such smallholders a subsidy. During the last thirty years about £150,000 have been paid out in financial support towards the cultivation of nearly 200,000 acres.

One significant fact is that the rural population in the heath districts, thanks to the reclamation work, has doubled in sixty years, and in addition the Heath Society, through its various activities, creates considerable employment. Further, the Society has awakened interest in this work to such an extent that wealthy men from Copenhagen and other towns have bought stretches of heath and spent large sums upon their cultivation, not with financial gain as their aim but from an altruistic motive.

In order to assist the peasants in planting hedges and other shelter, the Heath Society has distributed gratis or at reduced prices as many as seven-and-a-half million plants in a year. It has demonstrated experimentally that shelter may improve the yield by as much as 30 per cent., quite apart from the fact that many fields would be useless without the sheltering trees. Where land does not lend itself to agriculture, afforestation is tried, and there are now plantations covering 375,000 acres (of which 220,000 are directed by the Heath Society), an increase in the wooded area of Jutland of 300 per cent.

Draining and the regulation of burns is another great and important work of the Heath Society. Producing the drain pipes used last year meant 200,000 days of work, and the draining itself another 400,000 days, or the equivalent of the constant employment of 2000 workers for a year. The Society has also examined and tested the soil and has encouraged the peat industry. About 1200 million turfs were cut last year—an increase of 50 per cent. on the pre-War figures.

Denmark has been fortunate in having as one of its sons the great philosopher and reformer, N. F. S. Grundtvig, who founded the Folk High Schools which are undoubtedly the foundation of Denmark's prosperity and success as a farming country. The movement, which I am glad to see is now spreading to Scotland, may be expected to be as beneficial here as it has been in Denmark. The Folk High Schools, of which there are fifty-nine in Denmark to-day, instil in the young men and women who attend their courses a feeling of love for their native land, of community, and of desire for further knowledge. The pupils, of whom there are some six

thousand every year, get a sense of responsibility and enjoyment in their lives and work. It is thanks to what they have learned at the Folk High Schools that Danish farmers are not so conservative as those of most other countries. They are receptive and understand how to apply the latest scientific methods in their daily work, to such an extent that an average farm in Denmark to-day is a place where the results of the laboratory can be practically demonstrated. The pupils at the Folk High Schools work and play together, so that co-operation comes naturally to them in later life.

While co-operation in distribution, as with the Co-operative Stores, is comparatively insignificant in Denmark, co-operation in production is extensive. There are thus 1411 co-operative dairies, treating 91 per cent. of all the milk treated in dairies. There are 62 co-operative bacon factories, shipping 86 per cent. of the bacon exported. And there are likewise co-operative societies for the export of cattle and eggs, poultry killing, and feeding stuffs—in fact, for every branch of farming.

I am often asked how it can pay a Danish farmer to produce the finest butter and eggs and to market them in this country at competitive prices in spite of a heavy import duty. It is sometimes assumed that the standard of living in Denmark must be lower than that of Scotland, but this is not the case. Again thanks to co-operation, the Danish farmer is free of the business side and is thus able to devote all his time to the farm and the work of producing. Secondly, by far the greater part of the farms are small-holdings which can be worked by the owner and his family; of the 204,000 farms in Denmark, 28,000 are less than 8 acres in extent, 78,000 are from 8 to 25 acres, and 72,000 are between 25 and 75 acres. And one more very important point : 94 per cent. of the farms are freehold, owned by the farmer, so that he has an interest in keeping the farm in good repair and is sure that he or his family will benefit from every improvement he makes. The distribution of ownership is :—

Large farms	1 per cent.
Peasant farms	48 per cent.
Small-holdings	51 per cent.

Nearly one-half of the population lives in the country, although actually only one-third is attached to agriculture. One-quarter lives in the capital, Copenhagen, and the remaining quarter in the provincial towns, of which Aarhus in Jutland is the most important, followed by Odense on Funen, Hans Andersen's birthplace.

Denmark possesses no minerals. It has to import all its requirements of coal, iron and steel, yet it is foremost in shipbuilding and the manufacture of many kinds of machinery. It was due to Danish science, skill and enterprise that the first ocean-going motorship, the *Selandia*, was built at Copenhagen in 1912. On the ship's maiden voyage from Copenhagen to London she was signalled to

with the enquiry whether she wanted assistance, as she had evidently lost that funnel which the builders had never put in ! During the following twenty-five years the *Selandia* travelled one-and-a-quarter million miles, or fifty-five times round the earth, and during that time she spent only ten days in port for the purpose of overhauling the machinery. To-day the tonnage of Danish motor-ships exceeds that of steamers. The world's total motor tonnage is fifteen million tons gross, of which 41½ per cent. are provided with Danish B. & W. Diesel engines, built either by the Company itself or by its licensees. I should like to emphasise that neither shipping nor shipbuilding is subsidised in any way whatever.

During the last few years several traffic bridges have been built in various parts of Denmark, the most important being the Storstroems Bridge between Zealand and Falster. This bridge was opened in September 1937 and is the longest traffic bridge in Europe (two miles). It has proved that where a bridge is built, the traffic will come : the number of motor-cars passing between Zealand and Falster the year before the bridge was opened was 50,000, while in the following year it increased seven-fold to 365,000. The second important bridge, the Little Belt Bridge between Jutland and Funen, was opened in May 1935 and is three-quarters of a mile long. It was crossed last year by 598,000 motor-cars. The success of these bridges has prompted an association of engineers and contractors to draw plans for a bridge eleven miles long over the Great Belt between Zealand and Funen, as well as for a " minor " one nine miles in length between Copenhagen and Malmö.

Industry and handicraft give employment to 29 per cent. of the population. Mention should be made of the Beer Breweries of Carlsberg because they were bequeathed by the founders to a trust managed by members of the Royal Society of Science at Copenhagen, and all the profit goes to benefit science and art. By doing this, J. C. Jacobsen followed out still further the thought he expressed when at an early stage he built a laboratory, but laid down the one condition, that " No result of the work of the institution that is of theoretical or practical importance shall be kept secret, but shall be open to everybody in the world."

Schooling in Denmark became compulsory in 1814, and Denmark and Scotland have amongst many things in common the ideal that nobody who has the ability and wish for higher education shall go without for want of means. Except for a matriculation fee of £1 and a still lower fee for examination, the university training is free. The fee at the Folk High Schools is about 70s. per month including board, and even this cost can be reduced by applying to the County Council for a grant. Denmark spends more money on books per head of the population than any other country in the world.

It is no exaggeration to say that as regards the Social Services Denmark is second to none. There are no extremes of wealth and

poverty. Destitution is practically unknown. Much public assistance is given as something to which the recipient has a legal right. Men and women are eligible at sixty for the old-age pension, and have been so for nearly fifty years.

No description of modern Denmark would be complete without mention of its commerce. Denmark exports annually about 150,000 tons of butter, 180,000 tons of bacon and 1600 million eggs. It is of the greatest advantage for an industrial country like Great Britain to have an agricultural neighbour such as Denmark, which can send regularly fresh foodstuffs of the best quality at a low price. Further, if Denmark could not export its produce it would not be in a position to buy from this country, and although Denmark is only half the size of Scotland it is Great Britain's *second largest* European customer (1938). Danes take a deep interest in Great Britain, and the Danish British Society at Copenhagen has the largest membership of any British society abroad.

SCOTTISH VIEW INDICATORS AND PANORAMAS

By William Mair, F.R.S.E., F.R.S.G.S.

One of the earliest pictorial and panoramic representations of Edinburgh is by a local artist, Robert Barker (1739-1806). In addition to a set of six comprehensive views of the city, one of these from the Calton Hill, published in aquatint in 1792, he had produced in 1788 a panorama of Edinburgh in the form of a cylinder 25 feet in diameter which was the forerunner of the diorama. John Slezer (1650-1714), a Dutchman who settled in Scotland as a draughtsman, had begun the publication, in 1678, of his *Theatrum Scotiæ*, preserving for us the features of many places as they then appeared. Prior to the advent of photography (1839), engraving had attained the height of its popularity and many city views were published in black-and-white or coloured by hand, some of which are still extant. One of the finest and now one of the rarest was that of "Edinburgh and the Surrounding Country as seen from the Calton Hill," 1841. A copy of this print was presented in 1934 by Her Majesty Queen Mary to the Palace of Holyroodhouse. It is in colour, framed ($7\frac{1}{2}$ feet by $10\frac{1}{2}$ inches), and may be seen in the Queen Mary of Scots Apartments there. The artist was J. W. Townsend : it is reproduced on the accompanying plate by permission of Mr. J. Wilson Paterson, C.V.O., M.B.E., the custodian of the Palace. All the landmarks and distant places visible are named, with the distances and elevations. This fine drawing depicts Princes Street very accurately, but without the Scott Monument, not completed till three years later, and it embraces the whole Firth of Forth, with the Lomond Hills and the Ochils in the back-

[*Photo W. Mair.*

PLATE 1. Arthur's Seat View Indicator ;
Granite Pedestal.

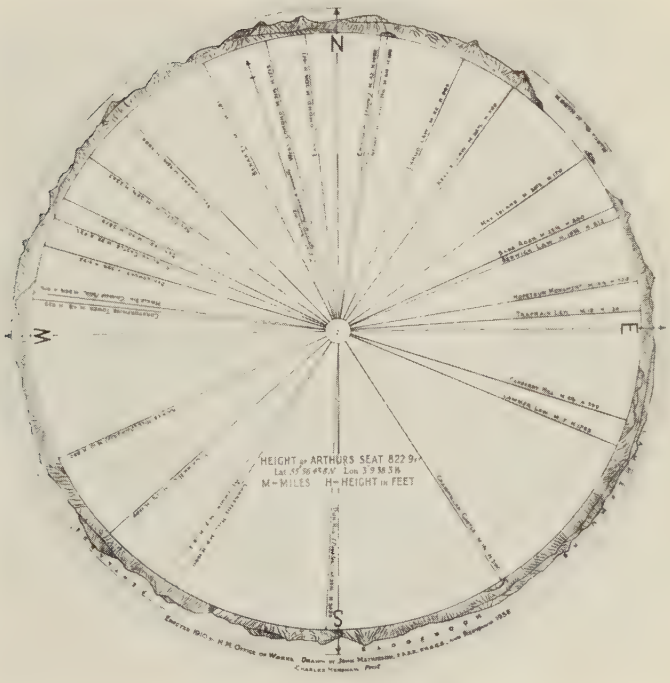


PLATE 2. Arthur's Seat, Edinburgh ;
Engraved Bronze disc, 26 in. diameter.

[*Photo B. H. Humble.*

PLATE 3. On the Summit of Ben Nevis ;
Loch Eil in background. Glazed stoneware disc Indicator.

[*Photo W. Mair.*

PLATE 4. Panoramic and Geographical View Indicator on
Braid Hills, Edinburgh.

ground, and extends from North Berwick Law, 25 miles, to Ben Lomond, 70 miles.*

One of the most remarkable of such publications was done from the crown of St. Giles' by an unknown artist who sketched in amazing detail the vista extending from the Castle to the scarred face of Caerketton in the Pentlands. The date was about 1812. This and others of that period were " drawn on stone." A wonderful drawing of the Grampians as seen from Ben Cleuch, highest point of the Ochils, was made in 1820 by James Gardiner when he was stationed there on the Trigonometrical Survey. It is in colour, $7\frac{1}{2}$ feet long by 18 inches : a framed copy may be seen in the library of the Royal Scottish Geographical Society.

In 1895 Mr. James E. Shearer, S.S.A., prepared an extensive and important panorama of the complete view from the summit of Ben Nevis, during a week of unusually perfect June weather, giving the names of the chief mountains, lochs and islands extending from Arran to Inverness and from the Outer Hebrides and the whole Western Archipelago to the imposing range of the Ochils. This was published at that time as a coloured engraving and has been republished (1937) by the Scottish Mountaineering Club, the original drawings having been purchased by Mr. James A. Parker (then President), and presented to the Club. The four sections as now printed extend in all to 8 feet.

Mr. Shearer had previously, in 1890, prepared a circular contour drawing of the landscape as an index to the view obtainable from the Ladies' Rock, near the castle of Stirling, including an enlarged central section of the Western Grampians, with the elevations of all the peaks visible from that point. This and another on the Wallace Monument, Abbey Craig, Stirling, also drawn by Mr. Shearer, were the first view indicators erected in Scotland, paper charts framed under glass, and have been renewed from time to time. About 1894 the late Professor Sir Patrick Geddes, with his advanced outlook on regional and civic survey, had directional arrows cut into the stone parapet of the high Outlook Tower on the Castle Hill, Edinburgh. These were accurately orientated by J. J. Reclus (1830-1905), a French geographer then Professor at Brussels. This was the first of six such guides now erected on commanding view-points in Edinburgh.

A more permanent medium was sought and found in the bronze disc now generally used, usually about 26 inches in diameter, on which are engraved the orientation lines and other requisite data. This was originally suggested by the late Mr. W. T. Oldrieve, F.R.I.B.A., and it was carried out for the first time on a view indicator erected in 1910 on Arthur's Seat—Sphinx-like guardian of Midlothian—to the design of Mr. John Mathieson, F.R.S.E., F.R.S.G.S. (Plates 1 and 2). Except for the attentions of vandals, it has proved, during the thirty years of its existence, practically

* The Ordnance Survey (1848) gives the distance from Edinburgh as 58·4 miles.

imperishable. It was made by Mr. Charles Henshaw, Edinburgh, who in similar works has since introduced a harder bronze, less readily disfigured. Among the more distant landmarks which may be seen from here with the naked eye on a clear day are : Ben Lomond, 59 miles ; Ben Venue, 53½ miles ; Ben Ledi, 50 miles ; Ben Lawers, 58 miles ; Ben-y-Gloe, near Blair Atholl, 63 miles.

There are now forty more or less commanding eminences in Scotland on which these friendly indicators have been placed, whereby the features of the widespread landscape may be readily identified. They vary in style and in the material of which they are constructed. The Society's list, here published, shows them in order of their erection and also their elevations above sea-level. The most recent is one erected in bronze disc form at the high view-point of the Edinburgh Zoological Gardens. The orientation lines of this and a contour map round the edge are also by Mr. Mathieson. Of those enumerated in this list he has been responsible for six others : one in two segments of a circle on the pigeon turret of the Sir Walter Scott Centenary Tower on Corstorphine Hill ; the very fine one on Middle Eildon Hill, which records that " from this spot Sir Walter Scott was wont to view and point the glories of the Borderland " ; a recent one at Bathgate, to which have been added the names of three places which it was afterwards discovered could be seen from that point ; one on Ben Lomond ; one on East Lomond, Falkland Hill ; and the photographic one on the Braid Hills, Edinburgh.

Mr. James A. Parker, M.Inst.C.E., of Aberdeen, previously mentioned, has designed five, all in a whitish glazed stoneware by Doulton, the lettering in black, burned in. They are : Lochnagar ; Ben Macdhui ; and most important of all, Ben Nevis (Plate 3). The first and second were erected by the Cairngorm Club, the third by the Scottish Mountaineering Club. His also are the one on Tinto, sponsored by the S.M.C. and the Ladies' Scottish Climbing Club, and that on Blue Hill, Aberdeen. These have proved very durable but are liable to be chipped : unlike the metal plate no subsequent alterations or additions are possible. There is another in the same stoneware on the Pulpit Hill, Oban : all are similar in diameter, 24 or 25 inches.

With the exception of the one or two mentioned which are on paper, and another on Goatfell which has suffered hopelessly, the others are in metal, some chromium-plated. The farthest north is at Grantown-on-Spey, a panoramic and contour view of the Grampian Range. A notable omission is Ben Lawers, highest point in Perthshire, and there is no indicator on Ben More in Mull, with its wide prospect of the everlasting hills—Morven, Appin and Lorne—great Lords of the Isles.

Although it is possible to ascend Ben Nevis many times and see nothing, there may be distinguished on a clear day :—to the north Ben Wyvis, Inverness, 63 miles ; to the west the unmistakable

serrated profile of the Cuillins in Skye ; eastward the plateaus of the Cairngorms and the pure cone of Schiehallion, 36 miles away ; to the south Arran, 50 miles, and Ben More ; beyond that the Atlantic and possibly Ireland, 120 miles.

One of the most accessible and about the most central—Ben Cleuch, just above Alva—is almost the most remarkable in range of view. The position of twenty-three towns and portions of twenty-five counties may be seen from its summit, south as far as Tinto and the Pentlands, west to Ben Lomond and The Cobbler. The present view indicator replaces one on paper which was drawn by Mr. James E. Shearer and based on the Trigonometrical Survey of 1817. The chromium-plated bronze disc now shows a fine geographical drawing of the Forth from its source at the " Clachan of Aberfoyle," past Stirling to the estuary and the sea.

From the summit of Ben Lomond both the Atlantic and the North Sea are visible and also Edinburgh and Glasgow, with a comprehensive view of Caledonia stern and wild in all the beauty of its Highland scenery. It has been computed that the circumference of the visible horizon from Ben Lomond is not less than 450 miles.

Towards the green and pleasant land of the Borders, Mr. Parker's indicator on Tinto Tap, between Carstairs and Abington, carries also an outline map of the Clyde valley and the Moffat hills, where

" Annan, Tweed and Clyde
rise oot o' ae hillside."

There are seventy-four pointers to landmarks which may be distinguished in twenty-two counties—Ben Cleuch in the Ochils due north, and Lochnagar, 95 miles ; the Fifeshire Lomonds, 50 miles to the north-east ; in the west Goatfell, Arran and Ailsa Craig with perhaps a glimpse of County Antrim beyond, 106 miles ; to the south Skiddaw in Cumberland, truly a marvellous breadth of prospect. The data are corrected for curvature and refraction.

An unusual form is that at Laggan, Glen Shiel, which consists of a horizontal relief in bronze and enamel, 3 feet 4 inches by 2 feet, representing an area of 500 square miles tributary to the Lochaber water-power scheme. The lochs are shown in blue enamel, the great concrete dams in white, and the names of the mountains and their heights are cut into the bronze, with the 15-mile tunnel through Ben Nevis clearly indicated. It is all to the scale of one inch to one mile.

Two are photographic, one by Mr. Robert M. Adam, F.L.S., erected in 1920 by H.M. Office of Works on the high part of the Royal Botanic Garden, Edinburgh. The other, on the Braid Hills, Edinburgh (Plate 4), was erected privately and presented to the City in 1937. It is represented on the accompanying plate on one-third the scale, embracing in a radius of 25 miles and 75 degrees of the horizon the whole magical panorama from Traprain Law to the twin

summits of Craiglockhart, with striking views of city and environs, the whole of the Firth, and the Fife Hills. In the distant landscape the characteristic profile of Ben Lomond may be readily distinguished. This photograph is set up under thick plate glass in a strong teak-wood frame designed by the City Architect, Mr. E. J. Macrae, F.R.I.B.A. On the reverse is a map (scale one inch and a half to one mile) presented by Mr. John Bartholomew, M.C., F.R.G.S., indicating all the landmarks to the south, including the Pentland range, with the elevations and contours. Paths for pedestrians and the guide posts erected by the Scottish Rights of Way Society are also shown.

This department of topography may have a useful place in primary and secondary education. There could hardly be a better way of teaching young people the geography of their own and remoter areas than by having the main features accurately pointed out to them by means of such a record as that now provided on so many Scottish natural points of vantage. To mountaineers, in the not unusual event of haze or mist descending suddenly at the summit of the higher hills, the reliable indication of the points of the compass and of the nearest way to a safe descent can be of great help in avoiding mishaps. Among other indicators contemplated is one by the Town Council of North Berwick for Berwick Law, an excellent view-point which they have recently acquired; and one is in process of erection at Alyth, Perthshire, designed by Mr. T. G. Philip, M.A.

List of Mountain View Indicators in Scotland, 1939

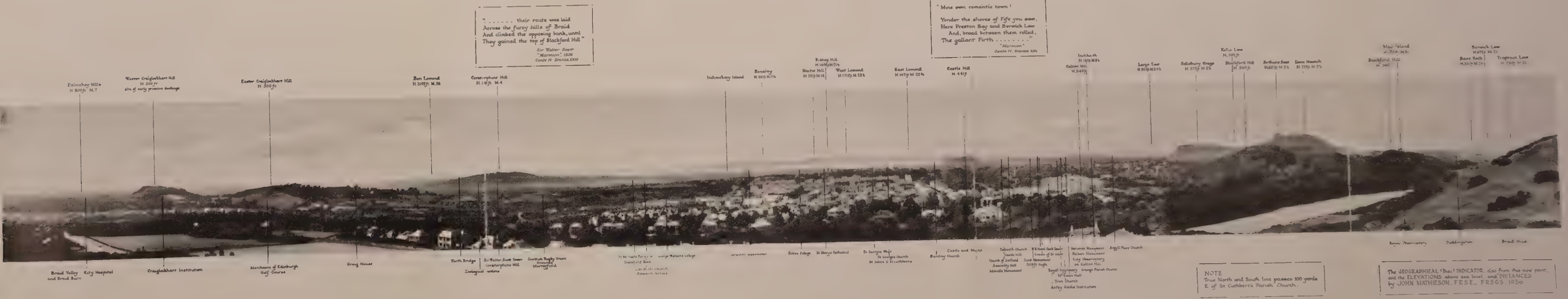
Compiled by W. Mair

		Altitude (feet above sea-level).	Material.
1890	Stirling : Ladies' Rock . .	274	Paper, framed and glazed
„	„ Wallace Monument .	602	„
1894	Outlook Tower, Edinburgh . .	441	Stone
1900	Dundee : Law Hill . . .	572	Copper
1903	Kinnoull Hill, Perth . . .	729	Paper, framed and glazed
1909	Balmashanner Hill, Forfar . .	572	Bronze
1910	Arthur's Seat, Edinburgh . .	822	„
1911	Gleniffer Braes, Paisley . .	550	„
1912	Douglas Park, Largs . . .	600	Paper, framed and glazed
1913	Corsiehill, Perth	490	„
1914	Grantown-on-Spey . . .	1200	„
1915	Craigie Hill, Kilmarnock . .	507	Bronze
1917	Brimmond Hill, Aberdeen . .	870	„
1920	Royal Botanic Garden, Edinburgh .	250	Photographic
1922	Cormack Hill, Blairgowrie . .	690	Brass
1924	Lochnagar	3586	Stoneware

Isle of May. 29 m. (Lighthouse)
Gullayn Point 16 m.
N. Berwick Law. 940 ft. 25 m.
Arthur's Seat. 822 ft. Burns Monument
Railway Station
Edinr. Coal Gass Works
Pentland Range
Tron Kirk
High Kirk
Edinr. Castle. 383 ft. Bridwell & Governor's House
Stewart's Monument
Earthen Mound
Princes St. Register Office
Ben Lomond 3342 ft. 70 m.
Ben Clach 2390 ft.
Town of Burnt Island
Largo Law 1000 ft. 25 m.

Edinburgh and the Surrounding Country as seen from the Calton Hill. Published 1841. Presented 1934 by H.M. Queen Mary to the Palace of Holyroodhouse.

(The identification of landmarks is as given in the original print.)



Photographic View Indicator on Braid Hills, Edinburgh.

Reproduction on one-third scale.

Presented by

Mr. William Mair, F.R.S.E., F.R.S.G.S.

		[1]Altitude (feet above sea-level).	Material.
1925	Ben Macdhui	4296	Stoneware
1926	Hardhill, Galston, Ayrshire . .	867	Bronze
1927	Ben Nevis	4406	Stoneware
„	Ranfurly Castle Golf Course . .	420	Paper, framed and glazed
„	Middle Eildon Hill, Melrose . .	1385	Bronze
1928	East Lomond, Falkland Hill . .	1471	„
1929	Ben Lomond : (renewed 1933) . .	3192	Chromium-plated
„	Blue Hill, Aberdeen	467	Stoneware
„	Goatfell, Arran	2866	Paper, framed and glazed
„	Kirriemuir Hill	631	Bronze
„	Tillicoultry Hill, Wester Kirk Craig	600	Linen, glazed
1930	Ben Cleuch : (renewed 1934) .	2363	Chromium-plated
„	Knock Hill, Crieff : (renewed 1934)	793	„
„	Pulpit Hill, Oban	242	Stoneware
1931	Hume Castle, Berwickshire . .	787	Bronze
1933	Auchengillan Hill, Stirlingshire .	650	Chromium-plated
„	Corstorphine Tower, Edinburgh .	607	Bronze
„	Dumbarton Castle . . .	240	„
1934	Everton Park, Inverkip . .	530	Chromium-plated
„	Laggan Dam, Inverness-shire .	854	Bronze and enamel
1935	Princes Park, Falkirk . . .	375	Chromium-plated
„	Tinto Hill, Lanarkshire . .	2335	Stone
1936	Craigs Top, Greenock . .	426	Bronze
„	The Knock, Bathgate . . .	1015	„
„	Dumyat, Ochils	1375	Stoneware
1937	Braid Hills, Edinburgh . .	525	Photographic
1938	Zoological Gardens, Edinburgh .	510	Bronze

THE FUTURE WORK OF THE ORDNANCE SURVEY: A REVIEW

By Professor A. G. Ogilvie

The Departmental Committee on the Ordnance Survey, appointed in 1935 with Viscount Davidson as Chairman, has now issued its Final Report, a concise document of twenty-nine quarto pages illustrated by a number of specimen maps.* An interesting chronological table of the Survey's history is added as an appendix, from which it appears that the present Committee is the nineteenth body appointed since 1824 by the Sovereign, Minister or Parliament to advise on the Department and its work.

The terms of reference this time were concerned with (*a*) the acceleration of the general revision of O.S. maps and their maintenance thereafter at a high level of accuracy ; (*b*) the more immediate revision of maps for the purpose of town and country planning schemes ; (*c*) the

* *Final Report of the Departmental Committee on the Ordnance Survey.* London : H.M. Stationery Office, 1939. Price 5s.

review of the scales and styles of the maps ; and (*d*) the conditions upon which reproduction of the O.S. maps is permitted.

Since the Committee issued an interim report on questions (*b*) and (*d*) in December 1935, the Final Report refers mainly to the other two and it deals logically with scales and styles before approaching the question of revision. To appreciate the findings, it is necessary to recall that the basic map of all the cultivated parts of Great Britain is that on the scale of 1 : 2500, or approximately 25 inches to 1 mile. This map, which was begun in 1853 following the completion of the Principal Triangulation of Great Britain (1791-1852), now consists of 51,456 plans and is a national asset of great importance and without parallel in other countries. But since the War very many plans have become seriously out of date ; the system of periodic revision adopted in 1896 as suitable in the pre-War period can no longer be maintained in view of the rapid changes now induced by man on the face of Britain. On the other hand these changes, of economic, social and technical character, lead to an increased use of the sheets of the basic map or of those smaller-scale maps which are derived from it ; hence the urgency of reform in the methods of the Ordnance Survey and the need for a great increase in its staff and means of production. The prospect of such improvements offered opportunity for the systematic consideration of a number of matters, relating to the various publications of the Department and covered by the words " review of scales and styles " of the maps. The Committee discussed, furthermore, the fundamental question of the projection of the basic map.

The Departmental Committee, recognising that the purpose of a national survey involves the most varied service to the public as well as to the defence of the realm, invited and took evidence from ninety sources, including Government Departments, scientific societies and private persons. Among these was the Council of the Royal Scottish Geographical Society, who were asked in January 1936 to furnish evidence on the two questions remaining to be investigated after that date, viz. : " styles and scales " and " revision." The Council, upon the advice of a special committee appointed to study these matters, forwarded its written evidence on March 5th, and were later represented in London by Professor A. G. Ogilvie (Hon. Secretary), who was examined orally on the evidence. In the following account of the Final Report the opinion of the Council will be referred to in so far as it is pertinent.

Scales of Maps.—The Society was asked in particular for its views on the desirability of introducing a uniform system of decimal scales as opposed to the existing series which combines these (1 : 2500 and (1 : 1,000,000) with scales based on inches and feet to the mile (1 : 10,560, 1 : 63,360, etc.). The Council recommended no change, but stated that a decimal scale should be considered for any new series such as the one they proposed between the " Six-Inch " and the " One-Inch." The Report now recommends the trial of a new, medium-scale map at 1 : 25,000, or approximately $2\frac{1}{2}$ inches to 1 mile, similar to that already in use in some areas for military purposes. This should prove to be of great general value and may be expected to serve the purposes of the map proposed by the Council on a scale of 1 : 20,000. While no changes in existing map scales are recommended, the Report discusses the subject carefully in relation to each map series.

An important innovation on British maps of all scales is proposed : the introduction of a national grid or reference index, the unit for which would be the international metre. This would replace the system of squares lettered and numbered separately for each sheet of the small-scale series, of which two editions would be published, with and without the grid. There are many advantages in a universal reference-system of this kind, by which exact positions can be stated from a map of any scale in terms of simple measurements ; while in future the sheet-edges of all maps would coincide with grid-lines, thus facilitating the indexing of the map series themselves. Such a grid might, of course, be based either on the yard or on the mile divided decimally. But in favour of the adoption of the metre it is pointed out that the length of Britain from north to south is almost exactly one million metres. The co-ordinates of any point can, therefore, be limited to six figures : with the yard as unit, seven would be required. Map users need not, however, adopt the metre, kilometre, etc., as their measure : many would regard the grid references simply as numbers.

It is proposed that the basic national map, 1 : 2500, be recast on national instead of on county sheet lines and be drawn on a national projection. This means that these large-scale plans would in future cover each one square kilometre of country and that they would not " stop " as hitherto at the county boundaries. The former separate projection by counties, based on the central meridian of each, led to certain inconveniences, and the Survey considers that the elimination of these, coupled with the aim of applying the national grid, furnish sufficient reason for the redrawing of over fifty thousand plans. It may be recalled here that the Ordnance Survey has recently carried out a complete re-observation of the Primary Triangulation with the purpose of correcting slight local errors that had been disclosed, locating certain triangulation points that had become lost on the ground, and re-marking the stations by permanent pillars. This re-triangulation was a remarkable achievement for one year's work (1936-37), and its completion furnishes an added reason for recasting the projection.

The scale of the " Six-Inch " map, 1 : 10,560, admittedly bears a clumsy numerical relationship to that of the 1 : 2500 map from which over the greater part of Britain it is derived. The Committee discussed the project of replacing it by a map on the smaller scale of 1 : 12,500. Nevertheless they recommend the retention of this long-familiar scale, with square sheets to conform to the margins of the new 1 : 2500 map, of which 25 sheets would correspond to one " Six-Inch " sheet. The existing " Six-Inch " plates would, however, be retained for printing on demand for special purposes, *e.g.* those of the Geological Survey and of local authorities.

It must be noted that for great tracts of hill country, and notably for the Highlands of Scotland, surveys were not made on a scale larger than this. The Council of the Society in their evidence were, therefore, deeply concerned not merely with the maintenance, but with the improvement, of the " Six-Inch " map. Very many sheets of the Highlands lack contours, and the representation of natural features recognisable on the ground is so inadequate that serious map users, such as, for example, the officers of the Geological Survey, must insert these as best they can. Hence the statement that " The Council are most emphatic in their recommendation that contours be inserted on all sheets and all issues

of the map on 1 : 10,560. Moreover, they would draw attention to the fact that the representation of rocks on this map is entirely incorrect as regards most of the Scottish Highlands. The Coolin Hills, Isle of Skye, may be taken as an instance. In view of the fact that there is a large and increasing body of mountaineers and others interested in Scottish mountains, the Council consider that these rocky areas should be as carefully surveyed and represented as has been done in the case of similar parts of other countries, notably Switzerland." The Report does not specifically refer to the complete absence of contours or to other of the matters above mentioned. Indeed in the Section (44, p. 16) on contours it misleads the reader to think that some contours appear on all "Six-Inch" sheets. However, the Section concludes: "Having stated our opinion that additional contours should be introduced, we leave the details to be settled when the time is ripe for the Department to undertake the work."

The Council declared themselves satisfied in general with both scales and styles of the One-Inch, Half-Inch and Quarter-Inch to the mile maps as at present issued for Scotland, and confined themselves to suggesting minor improvements such as the introduction of a light oblique hill shading, as an experiment, reduction of the moorland sign, and the simplification of road categories except for the introduction of a new sign for drove roads. Such matters of detail, however, are not dealt with in the Report, which recommends simply that no change shall be made in the scales of these map series.

The Council took up the matter of place-names on the Scottish maps in their written evidence, which they concluded with an "offer to the Ordnance Survey of such help as they may be able to give in dealing with the whole subject of place-names in Scotland." While the Council's representative elaborated this matter orally before the Committee, no reference to the subject appears in the Report. For this reason and in view of the subsequent formation of a Place-name Committee by the Council, this aspect of cartography may be left for treatment in a later issue when the work of the new Committee will be described.

Revision of the Maps.—The Committee recommends continuous revision as the ideal solution of the problem of obtaining up-to-date maps. The procedure implied may be described briefly. By co-operation with other Government Departments and with local authorities, the Ordnance Survey would be informed of all important changes in every locality. In areas of rapid "development," surveyors would be stationed in the vicinity; and they would be sent to survey changes in any other district as soon as the accumulated list of changes were deemed sufficient to require such a visit. By this means surveyors should always be on the ground before former survey points and detail became obliterated, thus effecting a saving in time. This material would at once be incorporated in the manuscript copy of the relevant sheet in such manner that special reproductions of the sheet could be made at any time for a body requiring it and willing to pay the cost. But where alterations were considerable, the publication of a new edition would presumably be undertaken without undue delay.

The Committee considered carefully what part aerial photography might play in the task of revising 1 : 2500 plans now badly out of date, and in the recompilation of plans on the national projection which in some cases involves re-survey. Experiments based upon photographs

provided both by the Air Ministry and by a civil firm have shown that photographs may be useful and economical for the first of these purposes, where building and other developments have been considerable. Otherwise ground methods are cheaper. For the second purpose the photographs, if available in good time, should prove " of considerable assistance." The Government, therefore, are urged to consider the formation as soon as practicable of a special Air Survey unit capable of satisfying the requirements of the Ordnance Survey.

To overtake the arrears of large-scale revision within ten years the Survey would require over 1200 technical assistants. Since continuous revision should be started as soon as plans are brought up to date, an increase in the total strength of about 4000 is envisaged within the next four or five years ; to decrease after a similar period to between 3000 and 3500.

Other recommendations not referred to above are (1) that when the revision of the 1 : 2500 plans shall be complete, further investigations should be carried out with a view to establishing whether the requirements of urban areas would not be more adequately met by a survey on the 1 : 1250 scale ; (2) that the numbering of parcels of land on the 1 : 2500 plans be discontinued as soon as the national grid is established ; (3) that the Ordnance Survey should continue to publish archaeological maps ; (4) that the existing arrangements for revising the One-Inch and smaller scales should continue in operation ; (5) that the position of the Ordnance Survey should be reviewed annually with a view to the maximum practicable recruitment, until such time as the recommendations of the Report shall have become effective, and that such work should be adequately maintained thereafter.

PROCEEDINGS OF THE ROYAL SCOTTISH GEOGRAPHICAL SOCIETY

Meeting of Council (February 28th, 1939)

Membership.—Six ladies and gentlemen were elected Ordinary Members of the Society.

Presentations to the Library.—The following donors were heartily thanked : The Director, Military Operations and Intelligence, War Office ; Mr. David Haldane ; Dr. F. M. Halley ; Mrs. F. J. Henderson ; Mr. I. Jackson ; Sir George Macdonald ; Mr. John Mathieson ; Mr. D. G. Moir ; Colonel Rae ; Mr. Erik Schacke ; Mr. C. B. Boog Watson ; and Mr. William Williamson.

The Late Dr. John Gunn.—The Council received with deepest regret intimation of the death of Dr. John Gunn, which took place the previous evening. It was agreed that the Society should send a message of sympathy to Mrs. Gunn.

Newbigin Memorial Prize Award.—The Council agreed to the recommendation of the Newbigin Prize Committee as to the award of the medal for 1938.

Lecture Session, 1938-39.—Major George M. Coombs, B.Sc., addressed the Society in Glasgow, Aberdeen, Dundee and Edinburgh, on January

9th, 10th, 11th and 12th respectively: Subject, "Czechoslovakia" (illustrated). Mr. Erik Schacke addressed the Society in Glasgow on January 30th, Dundee on February 1st, and Edinburgh on February 2nd: Subject, "Denmark To-day" (illustrated). Captain John Anthony, M.C., M.A., B.Sc., addressed the Society in Glasgow on February 20th: Subject, "The Malayan Forests" (illustrated). Lieutenant-Colonel G. Dalyell of the Binns, C.I.E., addressed the Society in Aberdeen on January 31st and in Edinburgh on March 2nd: Subject, "The Persian Gulf" (illustrated).

The following Afternoon Lectures were delivered in the Society's Rooms in Edinburgh: January 18th: Miss Ruth Raeburn, "The Charm of Venice"; January 25th: Mr. Andrew Lyall, B.Sc., "The Isle of Mull"; February 8th: Dr. E. Wyllie Fenton, "How Agriculture changed the face of Scotland"; February 15th: the Rev. R. G. Walker, "From Chungking to Burma"; February 22nd: Mr. John Bartholomew, M.C., M.A., "Ragusa and the Dalmatian Coast." All the lectures were illustrated.

OBITUARY

John Gunn, M.A., D.Sc., F.R.S.G.S.

Dr. John Gunn, who died on February 27th in his eighty-first year, had been closely associated with the activities of the Royal Scottish Geographical Society for many years. He was an Orcadian by birth and was trained as a teacher. He had a brilliant career at Edinburgh University, and soon after graduating received an appointment as an Inspector of Schools. In 1892 he was asked to join the editorial staff of Messrs. Thomas Nelson & Sons, and remained in the service of that firm till his retiral last year. His knowledge of geography was of great value to the firm, and he wrote or edited several series of geographical readers and textbooks. His book, *Orkney, the Magnetic North*, published a year or two ago, bids fair to become the standard text on the subject.

Dr. Gunn joined the Geographical Society in 1895 and served on the Council from 1902 till 1909. He was made a Fellow in 1924. In 1916 his editorial experience led to his being appointed Honorary Editor of *The Scottish Geographical Magazine*. As Honorary Editor he was also *ex officio* Member of Council, and at committee meetings his powers of clear reasoning and logical statement were of great value. He made an acceptable Chairman at several of the afternoon lectures in the Edinburgh centre, he reviewed many books for the *Magazine*, and was always ready to put his services at the disposal of the Society whenever his wide knowledge and wise judgement would be of use. His well-known figure will be much missed at meetings of the Livingstone Club and at the various functions of the Society.

We would respectfully offer our sympathy to his widow and family.

G. S. D.

AWARD OF THE NEWBIGIN PRIZE, 1938

On the recommendation of the adjudicators, the Newbigin Prize and Medal for 1938 have been awarded to Mr. Andrew C. O'Dell, of Birkbeck College, London, for his essay, "A Geographical Examination of the Development of Scottish Railways." Mr. O'Dell's essay will be published in an early issue of the *Magazine*.

1939 Award.—A Bronze Medal and Money Prize will be awarded for the best Essay, suitable for publication in the *Scottish Geographical Magazine* (not exceeding 7000 words), on any subject relating to the geography of Scotland. The essayist is invited to select his own subject ; in future years the range of subject may be prescribed.

Essays, in envelopes marked " Newbigin Prize," must be lodged with the Secretary of the Royal Scottish Geographical Society, Synod Hall, Castle Terrace, Edinburgh, on or before October 31st, 1939. Full particulars regarding the Newbigin Prize will be found in the *Scottish Geographical Magazine*, 1937, p. 270.

REVIEWS OF BOOKS

EUROPE

Bens and Glens : Wayfarings in Scotland. By T. B. Stewart Thompson. London : James Clarke and Co. Ltd., 1938. *Price 5s.*

This is a pleasantly chatty account of wanderings throughout Scotland, from the pen of one who has himself travelled the road, and had adventures and mis-adventures on it. Though a few deal with the " south countrie " of Scotland, the majority of these talks are of favourite ways and climbs in the Highlands, particularly in the Cairngorms. One might single out, too, the chapters on Colonsay and Oronsay.

In a discursive book of this sort, one does not expect new material—that would be outside its scope. But one could wish that a few points were cleared up—for instance, Watling Street (p. 18) comes nowhere near Scotland ; and why use the form *Otterbourne* ? Again, it cannot be said (as on p. 16) that all " chesters " mark the sites of Roman or of British camps ; and the lairds of Swinton do not " date back in an unbroken line to the Saxon Heptarchy " (p. 28), though the Swintons of that ilk, former owners of the parish, may have done so.

The illustrations are excellent : as one expects the work of Mr. Adam will be.

A. M.

The Land of Britain. Part I. *Ayrshire.* By John H. G. Lebon. Part II. *Moray and Nairn.* By F. H. W. Green. London : Geographical Publications Ltd., for the Land Utilisation Survey, 1937. *Price 2s. 6d. each.*

The representation on the One-Inch maps of the Land Utilisation Survey, in an edited, adjusted and reduced form, of the facts of utilisation of each acre of Britain at a particular time (although the time may differ, even for parts of the same sheet), has great value, subject to the accuracy of the survey, as a record—but merely as a record. The authors of these volumes set out on the less laborious but more difficult and valuable task of interpretation. These and other volumes of the series, which with one exception are to deal with counties, have been planned to preserve a similarity in essentials, whilst retaining a flexibility which permits more detailed treatment of subjects of special local interest. The essential sections are the history of the survey, a discussion of the physical geography, an account of the distribution, within the area, of land used for each of the chief purposes recognised by the survey, and a regional description of the area by what are called Land Use Regions.

It is obvious that almost without exception these volumes will become the standard accounts of the agricultural geography of the areas with which they deal, and as in the analogous case of the maps and reports of the Geological

Survey, it will be the joy and privilege of other geographers to point out their sins of omission and commission. Opinion will differ most over the regional divisions. It is an interesting experiment to attempt one's own regional division, on the basis of the maps, for comparison with those of the authors. Such a comparison at once reveals those areas with a pronounced degree of individuality and those where regional subdivision has a more slender basis.

Mr. Green says of the principles on which his division is based: " The pattern of land utilisation has been made the main criterion. There have been taken into account not only the proportion of land in each region under different surface uses, but also the manner in which the differently utilised fields and plots are shaped and distributed. Also the study of parish crop statistics has led to the demarcation of certain important subdivisions where, though the main features of the land utilisation pattern may not be different, yet the actual crops grown . . . are of different proportions." The reasons for these subdivisions are not described sufficiently clearly to convince the reader of their importance.

" The study of the actual use of improved land is the heart of Agricultural Geography "—and in Ayrshire grassland in one form or another occupies about four-fifths of the improved land. To keep grass in good condition it is necessary occasionally to plough and re-sow, and this is done at intervals that vary from five to fifteen years. The land is cropped for two or three years before being laid down to grass again. Consequently the distinction between arable land and permanent grass by the stage in the rotation reached in a particular year is misleading. The criterion adopted by the L.U.S. was whether the grass had apparently been down more or less than two years, and as a similar criterion is adopted by the local farmers in filling up their returns to the Department of Agriculture, the statistics of the Department and those of the L.U.S. are similar. After discussing this matter at length on pages 38-41 (and not in Appendix I as the footnote on p. 25 states), Mr. Lebon very sensibly disregards the classification and the L.U.S. map and bases his regional division on the relation between the total grassland and the various crops, as given in the parish statistics of the Department of Agriculture.

In addition to the standard chapters the report on Ayrshire has chapters on the History of Ayrshire Farming, Animal Husbandry, and Marketing of Livestock and Milk. Of these the most valuable is the account of the historical development of farming in Ayrshire since the eighteenth century. The account of the distribution of livestock in the county is mainly an attempt to interpret some complicated statistics of the various ages and classes of stock; but the statistics remain undigested and seem an insufficient basis for some of the conclusions. The chapter on marketing consists of a report based on information gathered from men on the spot; most of the facts are new and interesting, but the general effect is unfortunately scrappy. There are many clear and helpful diagrams.

Both reports are commendably concise and workmanlike. K. H. H.

The Cambridge Region. Edited by H. C. Darby. Cambridge : University Press, 1938. *Price* 6*s.*

This interesting survey of the Cambridge region was originally prepared for the meeting of the British Association held at Cambridge in 1938. It deals with the two types of country found in Cambridgeshire and the Isle of Ely—the Upland and the Fenland—as well as with the Breckland (ch. 15) which lies almost entirely outside the county boundary. The first five chapters are concerned mainly with the physical features ; the next two are on archaeology and place-names ; and chapters 8 to 14 deal primarily with economic problems (*e.g.* agriculture, industries. fen drainage). No fewer than thirty-four contributors have written papers for this survey. This is an age of specialisation, and no one will be surprised that the services of two learned gentlemen are required to write six pages on the soils of Cambridgeshire. The variety of the subjects discussed and the up-to-date information provided will attract many readers to this study, the value of which is enhanced by numerous maps, plans and diagrams. W. O. H.

Days in Old Spain. By GERTRUDE BONE, with illustrations by MUIRHEAD BONE. London : Macmillan and Co. Ltd., 1938. *Price* 12*s.* 6*d.*

This book should be read slowly, partly because of the careful choice of words in the writing of it, chiefly because the author has herself dwelt upon old Spanish characteristics in out-of-the-way places with unhurried attention. The " days " are scattered about the Peninsula without special classification. They are dainty sketches of selected subjects chosen first in Andalusia, then in centrally-situated medieval towns such as Segovia and Avila, but most interestingly in the north-west which is so seldom visited. Who amongst Lady Bone's readers will know just where Madrigal is, or Leon, or even Cuenca, " tossed up on precipices, half old Edinburgh, half Mount Athos, within a rim of grey, tragic and ashen hills " ? Leon was a place of early Visigothic kings, and was one of the named towns of the kingdom that was Alphonso's when his titles were proclaimed, but, as the author says, " the rise and recovery of so many small Spanish cities is often dwarfed by the impressive ruins of their history."

The author shows a very intimate knowledge of the development of architecture, the art in which Spain is pre-eminent, and has found churches which are hidden away and forsaken. Few readers will know of the quaint dance which takes place annually in the cathedral of Santiago after the great ceremony on the Day of the Apostle. The giant six-foot censer has been swinging right across the transept like a pendulum hung from the centre of the dome above ; the bassoons and horns have added their peculiar music, the vestments and uniforms have made a brilliant display, the red-gold sanctuary and the silver altar, the fifteen gold-mitred bishops, the shimmer of the light and the clouds of incense have all impressed the onlookers and reached their conclusion, when eight giant figures of wickerwork and papier-mâché are taken from their cupboards to dance, to their own music, first outside the cathedral and then before the altar in the empty building. Lady Bone has given a glowing description of the curious ceremony away up in the hills of Galicia, but elsewhere there are qualifying words introduced into otherwise direct sentences which seem to cloud her meaning. Of the illustrations, we like best those representing bold architectural subjects, such as the Apse of San Tirzo, Sahagún, or Old Trujillo ; but they are all thoroughly in keeping with the character of the book, no matter what individual preferences may be. W. L. C.

Pyrenean. By J. B. MORTON. London : Longmans, Green and Co. Ltd., 1938. *Price* 8*s.* 6*d.* net.

Inside Spain. By GEOFFREY BRERETON. London : Quality Press Ltd., 1938. *Price* 3*s.* 6*d. net.*

Journeys between Wars. By JOHN DOS PASSOS. London : Constable and Co. Ltd., 1938. *Price* 12*s.* 6*d. net.*

These three books all deal with Spain, though the last does so in part only. They are also alike in the absence of a map, which means that an atlas has constantly to be consulted. Mr. Morton describes a series of mountain walks which he took many years ago, crossing and recrossing the range by various passes from its eastern to its western end. He travelled alone and on foot, frequently spent the night out of doors in some lonely spot, had various adventures and met different types of people. The detailed account which he gives is based possibly on a very full diary kept at the time ; at any rate he has not troubled to bring it up to date, and it is odd to find him expressing a hope that the railway through the Somport Tunnel may never be brought to completion. It is, of course, well known that this line was opened to through traffic in July 1928.

Inside Spain is a record, by a newspaper correspondent, of various journeys made, apparently in the autumn of 1937, through Government Spain, with visits to Madrid and other towns. Save for one trip by rail, the method of travel was by lorry, and the author had opportunities to converse with all sorts of people. He seems to pin his hopes for the future to the Republic's scheme of

Agrarian Reform, but the general impression left on the mind of the reader is that of the futility and senselessness of the whole struggle.

Journeys between Wars, which is much the longest of the three books, consists of a series of articles, recording impressions rather than reflections. The plan followed is chronological, lying between the years 1919 and 1937. Thus the bewildered reader is hurried from Spain to Constantinople, Georgia, Persia and Irak, then to Russia, and in the last Section back to Spain, with digressions to Mexico, Guatemala and France. One is frequently left to infer from the headings of the different Sections what town or even country is being described. In addition, the incoherence of the style and the lavish use of slang, of colloquialisms and of American expressions makes the book at times practically incomprehensible, at least to the British reader.

M. E. N.

Italy (" Modern State Series "). By Robert Sencourt. London : J. W. Arrowsmith Ltd., 1938. *Price* 3*s.* 6*d.*

Professor Sencourt avers in his preface that " In writing history, as in writing biography, sympathy is the parent of justice." It is possible to reflect, however, that in such cases sympathy is not infrequently the parent of partiality, and at times even of prejudice. It is clear, however, that Professor Sencourt has consulted authorities of completely opposite opinions in order to attain what he hopes is a just conception of the forces at present in the ascendant in the country he knows so well.

It is wise that emphasis is given to the rise and shaping of Fascism after a concise and clear telling of the history leading up to it. There is an excellent review of the turbulence with which it arose and the violence from which it has emerged. The author's key-note in defining and illustrating Fascism is that it must be regarded as a spiritual or moral force, a state of mind by which men are bound to one another in the common interest of country and nation. The seventh chapter, " Fascist Principles Take Shape," should be read by everyone who desires a firsthand understanding of the force, and we venture to think that many people in Britain will be surprised by what they read. They will learn amongst other things that landed property and the aristocracy continue, that the Chamber of Deputies still functions, and how the Senate appointed for life by the king acts in an advisory capacity on constitutional and international affairs. Most important, especially to the Duce, is the Fascist Grand Council, which differs in no important respect from the Cabinet as we know it in this country. It appears that the Italian is free to make a success of any work he undertakes, but that, if he does not make a success, the State may intervene. But a Ministry or the Government is no longer an authority superior to the private individuals whom it may advise, a detached and neutral body administering the law. It is a body always desiring the greatest happiness of the greatest number, a Hegelian body. This is no place to enter into the differences between democracy and totalitarianism, but the reader will be stimulated by the careful writing of this seventh chapter.

The book brings us down to the absorption of Austria in the Reich and the anxiety on that account for various reasons experienced by Italy.

W. L. C.

In the Steps of St. Francis. By Ernest Raymond. London : Rich and Cowan Ltd., 1938. *Price* 8*s.* 6*d.*

This book takes us back for some seven centuries to the hard and difficult times after Richard Cœur de Lion had won and lost his Crusade and all Europe was in a state of turmoil. Mr. Raymond has made a pilgrimage to all the places which St. Francis is known to have visited. He traces his steps during the quarter of a century in which the Little Singing Saint travelled up and down Italy, he shows each centre clearly on a Route Map, and he gives pictorial descriptions ranging from the beloved Umbria to Bologna in the north and to Brindisi in the " heel." We follow him as he describes that heroic mission across

to Alexandria and Damietta, into that sorely vexed country called the Holy Land, and again when St. Francis took ship for Venice after Sultan Malik would have none of his call to repentance, although he claimed the prayers of this strange messenger of the Cross. Mr. Raymond paints an admirable background for the strange life and wanderings of one of the most lovable of men, he who shook the worldliness of the Roman Church and gave fresh vision for its faith, and yet there can be few contrasts in all history more grim than the vision of the last days of the Saint. It shows him suffering acutely as he limped blindly from La Verna, the mountain where he had hidden himself and had received the mystic Stigmata, down to the Palace of the Bishop, to be borne in state to die in Portiuncula, the home of his love, the Lady of Poverty. Who can but sympathise with the spirit of this Troubadour as he reads of the inscription by the wayside in Umbria : " In this place St. Francis taught the praises of his Creator to his sisters the birds " ? May not we also seek to catch his Vision through this story of long ago and far away ! G.-B.

In Czechoslovakia's Hinterland. By HENRY BAERLEIN. London : Hutchinson and Co. (Publishers) Ltd., 1938. *Price* 12*s.* 6*d.*

Under this somewhat inaccurate and misleading title Mr. Baerlein tells of a journey through Ruthenia, that eastern province of Czechoslovakia which as " part of the Ukraine " or " Sub-Carpathian Russia " is at present conspicuous in the newspapers as a bone of contention between Germany and Hungary. A book on such a subject by one who has himself travelled recently through the country can hardly fail to be of interest, even while one remembers that any book on Central Europe may to some extent become out of date before the author has seen the proofs. In any case Mr. Baerlein has anticipated criticism by making it clear that his book does not purport to be informative or systematically descriptive.

Some of his readers may feel that a straightforward travel-book would have had greater value, not only in 1938 and 1939 but for many years to come, than this would-be whimsical account of Mr. Baerlein's journey. They may feel that the pages of real interest are those which tell of the different races and languages of the Ruthenes, of the relations between the Greek Catholic and the Orthodox churches, of the treatment of the province by its Hungarian, and later by its Czech, rulers. *In Czechoslovakia's Hinterland* reads as if Mr. Baerlein would fain write another " Sentimental Journey." How far has he been successful ? That he is digressive and inconsequent cannot be denied, but has he recaptured the wit and delicacy of Laurence Sterne ? Readers may doubt the wisdom of his attempt when they find him capable of such passages as : " At Mukacevo the Czechoslovak authorities have established a Jewish High School in which the language of instruction is Hebrew and with lessons of Czech . . ."

It is a pity that the author has not related the letterpress to the most excellent pictures and raised it to their level. E. J. B. W.

ASIA

In the Steps of Moses the Conqueror. By LOUIS GOLDING. London : Rich and Cowan Ltd., 1938. *Price* 7*s.* 6*d.*

This is an interesting sequel to Mr. Golding's previous book, which told how he searched for, and found, various traces of the early years of Moses. In a similar manner, the present book takes up the search for reliable traces of the Desert Wanderings from the point where the previous volume closed. We follow Mr. Golding from the Gulf of Suez across the desert plateau to Akaba, on the other coast of the Wilderness, and from there on into Trans-Jordan. We follow him up the arid desert routes to Maan and Petra, where we have vivid descriptions of the limestone regions of the Arabah, before he passes into the Red Sandstone area. Especially commendable is a remarkable description of Petra with its Nabataean mysteries and also his references to the traces he found of that

brief and brilliant civilisation. And finally we follow him into Edom, and travel across its swelling plains to Amman, that city of many memories, to where the chronicle closes, fittingly enough, in the place where to-day the Allenby Bridge makes easy the crossing of the Jordan, yet brings to remembrance the slow-moving years since the great Leader who had been kissed by the Eternal was laid in his Unknown Sepulchre in the land of Moab.

For all its interest, we feel some want of compression in a book which must exceed 150,000 words ; but it shows much patient research and has considerable variety of unusual information about these days that are dead. It is carefully indexed and critics will find a good Bibliography, also a well-marked route map for confirmation of some of the moot points which are so unhesitatingly affirmed. G.-B.

Through the Garden of Allah. By JOHN GRANT. London : The Travel Book Club, 1938. *Price* 3*s.* 6*d.*

There is a good deal that is entertaining and instructive in this book, a not-too-well-written account of journeyings by business caravan of the old camel type in Turkey, Syria, Palestine and Egypt. The description of the bazaars of Istanbul, for instance, though familiar to all devotees of the Near East, is well re-told. But one gets rather annoyed at the ringing of the changes on the spellings Beirut and Beyreut, and I, for one, would join issue with any writer who states, " Unlike any other town Jerusalem does not seem to have ups and downs in its ordinary life by the occurrence of such ceremonies as Christmas and Easter, for a devout atmosphere is always present with the every-day conditions of the place." That has not been my experience on each of three visits, two at Easter time, and before the days of violent unrest now being experienced. In speaking of the concurrence of religious festivals in Jerusalem, Mr. Grant writes, " Never is there communal or religious riot or unpleasantness on that score." But strangest of all, perhaps, is the fact that the writer, in telling of the religious elements in Jerusalem, makes no mention of the Jews !

Two quotations (out of very many) will show what I mean when I describe the book as " not too well written " : " He had been putting off his men by saying that when he had more ' cargo '—meaning opium, from three more ports, and is successful in getting the stuff over to Italy, thence beyond where everybody will be well paid." " It was really a miracle that although six of our men and two of the attackers were wounded there were no casualties. Only one was dead." T. R.

Seen in the Hadhramaut. By FREYA STARK. London : John Murray, 1938. *Price* 21*s.*

As Miss Freya Stark lectured to the Society on the subject of her recent travels in the Near East, many readers of the *Magazine* will be specially interested in this beautiful picture-book. The formerly inaccessible land of Southern Arabia has been made slowly to reveal its peculiar characteristics, and in the words of Miss Stark, " The technique of travelling in Arabia has become very much better known." Illustrations of the remarkable architecture and buildings (" lovely, austere and delicate "), the decorated doorways and strange wooden locks, have previously been seen in Europe only in very limited numbers. From this volume we learn that over a thousand of the tribes which inhabit this region have signed a truce to their age-old quarrels, so that the possibility of peaceful penetration and the " Unveiling of Arabia " seems more and more within reach.

The range of the illustrations includes realistic impressions of the vegetation of the cultivated valleys, the primitive systems of irrigation, the manual labour which characterises to so great an extent the people's domestic affairs, the uses to which camels are put, the unveiled Beduin women, the natural children. There is a Foreword of 23 pages, in which the author, somewhat under compulsion from her publisher, gives a brief review of the land and its peoples. The remainder of the book is given to the pictures and their captions. W. L. C.

Sand and Sea in Arabia. By NORMAN LEWIS. London : George Routledge and Sons Ltd., 1938. *Price* 15*s.*

The publishers claim that this book is unique, because, apparently, it is a picture-book in which each picture is on a separate page with its own textual description, the sum of the latter forming a continuous story. This usage of the overworked word is surely a little strained. Miss Stark's book, reviewed above and also about Arabia, has the same format. Mr. Lewis's pictures have ample margins, while Miss Stark's have none. In each case the pictures are themselves splendid. Margins may be a matter of taste, but a frame or margin round a picture helps to unify the subject.

One is struck in this case with the discerning eye which has selected these subjects. One appreciates also the masses, lighting, and what the painter would call the " values." Some most interesting photographs illustrate the building of the dhows and buggalows of the Arabian coast. A voyage most varied in interest began at Aden in another native craft, a sambuk trading from Makalla, in which the photographer floated through the Bab al Mandeb, or " Gate of Mourning," and visited the pearling island of Kamaran and the deserted Suakin. A clearer conception of the route followed might have been afforded by a simple line map, which might have been included without detriment to the character of a charming book.

W. L. C.

The Spirit of India. By W. J. GRANT. London : B. T. Batsford Ltd., 1938. *Price* 10*s.* 6*d.*

To those who know India this book will recall many memories, and, while evoking some criticism, will be welcomed for its excellent portrayal of Indian life. To those who do not know India, and can learn of its peoples only through the words of others, the book will well repay close study, and particularly would I commend it to any who contemplate a visit.

The writer has to an unusually high degree the gift of being able to coin a telling phrase, though I do not like the verb in the sentence " However unassailable their arguments may be they could not *weaponize* their strength." Amongst many outstanding passages I particularly enjoyed the portrayal of the contrast between the land of the Bengali Hindu and that of his more western Mohammedan counterpart.

Mr. Grant never forgets what he states early in his book, that " Religion is the stage for all Indian thought and action." But I do not agree that " The western mind does not know what reverence is until it has seen Mohammedans at prayer." I have been in many mosques during prayers (including that of San Sofia on the Night of Power) and have felt equally with the writer the spirit of reverence brooding over or through the great congregation ; but I have felt it equally strongly in both large and small congregations in our own land. His chapter on the Anglo-Indian made me wish he had dealt more fully with this section of the community, which is not understood and which labours consequently under the disadvantage of many misunderstandings. The results, unfortunate in many cases, of attempts to occidentalise the Orient are dealt with in the closing chapters, and one is compelled to ask if the progress of India is being sought for along the right lines. Mr. Grant, I take it, would answer in the negative, and his long residence there, and the contacts he has made in his work and otherwise, entitle him to speak with knowledge.

It would be difficult to imagine a finer set of photographic illustrations.

T. R.

Lhasa : The Holy City. By F. SPENCER CHAPMAN. London : Chatto and Windus, 1938. *Price* 21*s.*

The old-time records of secret attempts to reach Lhasa from either the Chinese or the Indian frontier have passed into the land of forgetfulness, so that the works of Bogle and Manning or of Huc and Gabet, with their sparse, uncertain illustrations, stand far back among the dust-covered volumes that have long since

been replaced and amplified by modern travellers and especially by those who have entered since Younghusband opened the gates of The Potala to the then-hated Westerner. No better illustration could be given of the opening of this great Closed Land of Tibet than to contrast Mr. W. W. Rockhill's patient but frustrated attempts to enter during the 'nineties disguised as a lama with the cordial reception and great good-fellowship accorded to Mr. Gould's Mission to-day.

This is a book the scope of which could not have been even imagined by those early explorers. It tells of a special mission to Lhasa in 1936-7, from Darjeeling via Phari and Gyantse, which was welcomed and treated with the utmost friendliness. It includes a clear map, a careful index and a special botanical appendix; eight remarkable plates in colour and over a hundred monochrome illustrations, some of which must be unique. Four are given of The Potala, and many other sacred things have been revealed by Mr. Chapman's camera. All these help an easily-written account of Tibetan life and customs as they exist to-day and in the capital.

The "Historical Interlude" will be appreciated. It is well based on the classical works of Sir Charles Bell and Sir Eric Teichman, and enables Western readers to appreciate the *volte-face* of this strange people. G.-B.

Salween. By Ronald Kaulback. London: Hodder and Stoughton Ltd., 1938. *Price* 15*s.*

For those who enjoyed Hanbury-Tracy's *Black River of Tibet*—and that must be all who have read it—a further treat is in store. Here is another account, equally vivid, of the same expedition. The two books make excellent companion works.

The story of that journey, the eighteen months' search for the source of the Salween river in south-eastern Tibet, will stand out among even the high lights of exploration and travel. Kaulback's descriptions of the people he met, and of those who worked with and for him, are written with a gifted pen. Danger and discomforts are treated lightly and even humorously, though they must often have been almost heart-breaking, and graphic accounts are given of travel among mighty mountains, through almost unknown passes and equally difficult valleys. Technicalities of topography are avoided, yet the reader is kept aware of the objective of the journey.

It has been given to few to wander in those remote mountains, but Kaulback and Hanbury-Tracy have been excellent ambassadors for the future. I regret that I found it rather difficult to follow their journey on the map provided—a more definite line or, perhaps, a differently coloured route-track would have helped. Particularly interesting are the accounts of the "villages" at which the travellers stayed and the contacts with officials and peasants made *en route.*

A full index, which does not merely mention, for example, simply "Coolies," with reference to pages, but gives details such as "load carrying by," "method of rest on journeys," "difficulties in getting," etc., is praiseworthy. T. R.

Lords of the Sunset. By Maurice Collis. London: Faber and Faber Ltd., 1938. *Price* 15*s.*

Mr. Collis, an experienced traveller and writer, has had opportunity such as is afforded to few. Wedged between Burma, French Indo-China and the Chinese Republic, the Shan States are off the beat of the globe-trotter and comparatively little is known of them. The author was fortunate in having friends among the Government officials, and so was able to travel throughout this distant outpost, to see all that was worth seeing, and to learn at first hand all that was worth knowing. The result is a book both informative and humorous. With the exceptional facilities he enjoyed for visiting the various Courts and meeting the rulers and their families, Mr. Collis is able to write accurately of the conditions prevailing in the States.

The book is well illustrated. S.

Poison Arrows. By Grace Thompson Seton. London: The Travel Book Club, 1938. *Price* 3*s.* 6*d.*

The American lady who wrote this book is, to use her own term, an " exploratrice." From Saigon in French Indo-China she made a trip into the interior to study a tribe called Moïs. These natives, like other tribes, use poisoned arrows to kill their game—hence the rather awe-inspiring title. Her studies have not resulted in anything of particular interest. The book finishes with a visit to Bali, which, so far from being a field for exploration, is unfortunately a happy hunting-ground for the American world-cruiser, not to the advantage of the Balinese. The illustrations are very good. S.

Houses and People of Japan. By Bruno Taut. London : John Gifford Ltd., 1938. *Price* 12*s.* 6*d.*

Mr. and Mrs. Taut had been provided by a Japanese friend with a house in purely Japanese style, at two hours' distance from Tokyo by rail, and they found on arrival that they were obliged to adapt themselves to the conditions of the country, which, to them, were quite new and strange. This book contains a narration of their experiences in their new surroundings. It is profusely illustrated, both by engravings and photographs, and as some of the pictures are in the Japanese style they have a beauty of their own, as the work of an artistic people. It is worthy of notice that the book has been printed in Japan, by the Sanseido Press, Tokyo, and we can safely recommend it to readers who are interested in the country and its people. J. D. M.

AFRICA

Black Barbary. By Patrick Turnbull. London : Hurst and Blackett Ltd., 1938. *Price* 15*s.*

The author has spent a considerable time motoring through a part of Morocco which is not well known—the country of the Berbers, the original inhabitants. He has covered a good deal of ground among the Atlas Mountains and beyond, and gives interesting facts and descriptions, but we think his book would have been more readable had he shortened it considerably. One part of the country and one tribe are very much like another part and another tribe, and the constant repetition becomes a little wearisome. The book is profusely illustrated. S.

Treks and Palavers. By Captain R. R. Oakley. London : Seeley, Service and Co. Ltd., 1938. *Price* 18*s.*

Captain Oakley, with no pretensions to authorship, has written an extremely pleasant, interesting and informative book. He joined the Nigerian Government Service as an Assistant Political Officer and he tells us of his work in the various districts in which, from time to time, he served. Most of his service was on trek through his districts, and his descriptions of his own life and that of the natives, and of the country and its flora and fauna, are simply and unusually well done.

Unlike the books published by many modern travellers, this contains neither frills nor thrills. Captain Oakley does not claim the " hairbreadth 'scapes by flood and field " of the visitor of a few days' stay. A most refreshing trait of his is that, while having abundant opportunity to shoot, he seldom took advantage of it, and more than once when, coming upon some graceful wild animal he prepared to shoot, he found himself a little later gazing in admiration, unable to pull the trigger.

Several chapters are devoted to Kano, the Hausa capital, where the author was stationed as Magistrate for some time, and his account of the great commercial centre is the best we have seen.

A modest description of a somewhat humdrum existence, this book holds the reader's interest from the first page to the last, and is the best travel book we have read for a very long time. There are numerous excellent illustrations from

photographs by the author, and we trust his work will have the wide reading public it deserves. S.

African Majesty. By F. Clement Egerton. London : George Routledge and Sons Ltd., 1938. *Price* 18*s.*

We should think the standpoint of this book in its study of the African native is unique. Mr. Egerton apparently tired of civilisation and started out for West Africa, ostensibly as an anthropologist, really to live somewhere more or less primitively, but with no fixed objective. Landing at Duala in what is now the French Cameroons, he seems for a time to have pottered about the near-by towns, such as Ebolowa and Yaounde, and his descriptions of both native and European life are amusing. Ultimately someone suggested his making as his headquarters the little native kingdom of Bangangte, to the north of Duala, and there he settled for six months. Cordially received by the king of that state, who allotted him a part of his own royal " palace " for a dwelling, the author, cut off from his detested " civilisation," certainly had most unusual opportunities to study leisurely and closely every phase of a pagan native life almost untouched by European ideas. Mr. Egerton profited by his opportunities, and in this bulky volume nothing has been too trifling for him to note. We have a meticulous record of literally everything connected with the subjects of King Njiké II, from birth, through childhood, adolescence, marriage, recreation and labour, to death and burial. Njiké is a most likeable character, with his uncertain number of wives and his quite innumerable offspring, and is, from his photographs, a brawny and good-natured monarch. Neither he nor his subjects, fortunately, would appear to have adopted European clothing any more than European customs, and we are able to get a clear picture of the unspoiled native.

The author is an unusually expert and artistic photographer, and his numerous fine illustrations alone would make a most attractive volume. The book is bulky, and so lengthy that it would be somewhat boring but for Mr. Egerton's light and entertaining style. While it describes only a small native kingdom, probably different in language, customs and every other respect from the other little kingdoms next door, it should have a large and appreciative reading public. S.

African Odyssey. By Joseph Cradd. London : The Travel Book Club, 1938. *Price* 3*s.* 6*d.*

This book can hardly be classed as " Travel," and does not possess geographical interest. The writer, like so many other young men in South Africa forty-odd years ago, when fighting the natives was attractive and romantic, was a trooper in the Mashonaland Expedition at the beginning of this century and afterwards fought in the Matabele rebellion. Later he joined the Natal forces which put down the Zulu rebellion.

Although not a travel book, it has an interest of its own, especially to the lover of Rider Haggard and Captain Mayne Reid. One may be permitted to hope, however, that the lapse of so many years since the events described has impaired Mr. Cradd's memory, and that so many unfortunate natives did not fall, if not to his bow and spear, at least to his rifle and revolver. S.

AMERICA

Glories of the Maya. By Thomas Gann. London : Gerald Duckworth and Co. Ltd., 1938. *Price* 18*s.*

Wherever one goes in Central America, there are unexcavated or only partially excavated sites of ancient culture. It appears to be a place of successful search for the archaeologist. Dr. Gann has travelled extensively in Guatemala and British Honduras and in Mexico, accompanied throughout by his wife. The ordinary reader will find his book interesting as an account of

those journeys to unfrequented places and little-known peoples. Not until Chapter XXI, however, do we have a summary of Maya history which I wish had come earlier in the book. The highly-developed culture known as the Maya Old Empire lasted from about 100 B.C. to about A.D. 600, when many of its citizens migrated to Yucatan, where they founded the New Empire which continued until the Spanish Conquest. But we are also told that the earliest known inhabitants of Mexico date from about 2000 B.C. and are contemporaneous with the earliest culture of Guatemala. Then Toltec tribes migrated from the north who, fusing with the tribes already in possession, produced the Maya people, " from which sprang the various tribes which occupied Guatemala from the end of the first millennium B.C. till the present day."

There are forty-eight illustrations and two maps, but I would have liked a map of the whole region. An atlas does not, of course, give all the places mentioned. H. C. H.

The West Indies Year Book, 1938. London : Thomas Skinner of Canada Ltd., 1938. *Price* 10*s.*

This admirable publication, the twelfth issue, is a complete directory of general and statistical information regarding the official, business and trade aspects of the West Indian region, and includes also similar information about such outlying countries as the Bermudas and British Honduras, as well as the foreign islands. Since the tourist traffic has become of first importance, latest notes about steamship services, hotels and so forth are provided. A coloured map of the area contains also a series of insets. W. P. L.

Patagonian Year. By Pedro Rubio. London : Methuen and Co. Ltd., 1938. *Price* 7*s.* 6*d.*

Engaged in Patagonia surveying sheep-farming areas, the author came to the conclusion that it is not a country for adventure. He found the wastes vast, austere and terrifying, and the human element tough and reticent. What distinguishes a somewhat slight sketch is a sensitive appreciation of nature and an eye for the picturesque in the varied types of inhabitants. The Scots, who were the pioneers of sheep-breeding, he found a class who drank whisky like water, but they were a straight people to deal with. Many who bore a striking resemblance to Norwegians and used Norse words were probably Shetlanders, and not, as he supposed, Highlanders. A map would have been useful.

W. P. L.

AUSTRALIA

Over the Range. By Ion L. Idriess. London : Angus and Robertson Ltd., 1938. *Price* 6*s.*

The author, already well known for his writings on Australia, now describes a journey of twelve hundred miles with a Frontier Police Patrol through one of the remotest corners of the continent. The range in question is the Mount Leopold Range, Western Australia, which divides the coastal area around the town of Derby from the great plateau of the Kimberleys. Over the range lies the least known part of Australia, which has remained for so long undeveloped and indeed almost unexplored on account of its inaccessible position.

It is a lonely land where a few hardy pioneers and cattle-men live side by side (if such an expression may be applied to a country of vast distances) with aboriginal Stone Age men who are occasionally lawless in the civilised sense of the term and whose cattle-spearing activities were the occasion for the expedition in which the writer took part. He gives a vivid picture of a land with a future, but probably the most interesting feature of the book is his intimate account of the life of the aboriginal. Although the Australian aboriginal is the most primitive type of mankind in the world to-day, he is in some respects superior to civilised man. His knowledge of tracking is remarkable, and his means of

communication with his fellows at a distance is almost uncanny and quite as effective as modern wireless. The author explains the " message stick " and illustrates the subject with a series of drawings and photographs. Most of the illustrations are concerned with aboriginal life, which is, alas ! rapidly disappearing. All are clear and well chosen, though some are so small as to demand the use of a magnifying glass. D. G.

The Men and Birds of Paradise. By A. J. Marshall. London : William Heinemann Ltd., 1938. *Price* 15*s.*

A most authentic picture of the Australian Mandated Territory of New Guinea—which, however, is no Paradise—painted by a most authentic Australian who nevertheless consistently refers to himself and his antipodean companions as " Europeans." Apart from the unpleasing blasphemy at the top of page 19, this young author's second publication is a wholly admirable contribution to the growing literature on Melanesia. D. B. C.

OCEANIA

Tin Can Island. By Charles Stuart Ramsay and Charles P. Plumb. London : Hurst and Blackett Ltd., 1938. *Price* 15*s.*

Charles Ramsay, this Wiltshire youth who with an elder brother emigrated to New Zealand and subsequently settled on Niua Fo'ou in the Tongan Group, is obviously one of those men who are " cut out " for South Sea Island conditions, and whose life there has been widened and enriched, not wasted. He it was who inaugurated the system of swimming out to the monthly mail steamer with the island mail towed in a sealed tin can, and of receiving the inward mail similarly despatched, on account of the island's rocky, surf-swept shores to which no ship could safely approach. His life as a copra trader among the Tongan islanders is described with frank and simple candour, and numerous excellent photographic illustrations render vivid to the reader his adventures with shark, hurricane and eruption, for Niua Fo'ou is little more than the hollow cone of a volcano not altogether extinct which protrudes above the surface of the sea. The Tongan Islands being somewhat isolated and infrequently visited, the information contained in Mr. Ramsay's pleasantly-written account is of the greater interest. D. B. C.

POLAR REGIONS

Southern Lights : The Official Account of the British Graham Land Expedition, 1934-1937. By John Rymill. London : Chatto and Windus, 1938. *Price* 31*s.* 6*d.*

This account of an expedition remarkable in several respects for its innovations and discoveries is very welcome. For polar experts it will engage interest and provoke discussion ; for the lay reader it will suffer from a certain plainness in the story, and the fact that it has been necessary to compress the events of three years into a comparatively small compass. The book is never difficult to read, but there is a lack of light and shade, a rigid impersonality and an abstinence from minor incidents, those extras to a narrative which add the lighter touch, however much they may horrify the publisher with an eye on his costs.

The intelligent reader may discover much for himself that was new in methods of exploration. Rymill's modesty, however, prevents him from emphasising some of the ways in which he has departed from previous procedure. The low cost of the expedition, the amateur crew for his ship, the technique of using the aeroplane for reconnaissance are some of these items. They were, to some extent, forced upon him by lack of funds, but there is no doubt that he used them with skill. Indeed the expedition may be written down as the very best that could have been made of a cheap job, which, speaking in terms of polar exploration, is no light praise. An interesting aspect was that, with one excep-

tion, all of the experienced men were acquainted with, and were devotees of, Arctic technique. This they applied to Antarctic conditions with considerable but not overwhelming success, showing that the conditions themselves demand a somewhat different approach.

In one respect the work of the expedition has been a lesson and a warning to geographers. The plans made by Rymill were based on the discovery made by Wilkins from the air that the Graham Land projection of the Antarctic Continent was an archipelago. Sledging on the ground has proved that it is a peninsula, showing how misleading aerial discovery may be. Further, while Rymill was in the South, Ellsworth, on his fine flight across the continent, flew across some of the territory examined later by Rymill's sledging parties. The airmen not only missed the extraordinary King George VI Sound, but the maps made from their photographs have meant little until explained and altered by the work of the ground surveyors. These remarks are, of course, not aimed at the airmen, but at the conditions which prevent aerial work from being exact.

The book is very well illustrated, several of the pictures being quite in the Ponting manner; the maps are very good and keep up the tradition of the best type of polar narrative—that they shall be as comprehensive as possible.

F. D.

GENERAL

Handbuch der Geographischen Wissenschaft. Edited by Dr. FRITZ KLUTE. *Allgemeine Geographie.* II. *Geographie des Menschen.* By H. HASSINGER. Potsdam: Akademische Verlags Gesellschaft Athenaion m.b.H., 1938.

The popular press is not concerned about the niceties of such distinctions as Anthropology *versus* Anthropogeography. Much of the present volume is well-pictured anthropology. It is less well mapped. The English-speaking student of geography will find himself repaid by a cursory examination (with a special eye to the pictorial illustrations) of the sections on the geography of industry, of settlements and of communications which form the bulk of the work.

In general method the book is a study in duality of the regular German type: *Landschaft* and *Kulturlandschaft.* There are three pages of *Landschaftstypen.* "As touching this summary it must be pointed out that one is concerned, not with the existing, but with the original, condition of the *Landschaft.* Let no one, then, be startled to find the north Italian plain described as forest or northern China as forest-steppe." We are startled.

A heading, Synthetic Anthropogeography, engaged and disappointed our attention. The rubrics are: Peoples and Languages, Religious Communities, States—and (the reader will forgive our inability to translate the terms)—*Die Erscheinung* of Man in the *Landschaft.* This last is but a set of pretty pictures extending the series which, earlier in the work, illustrates the influence of man on his environment.

A. S.

Kazak Social Structure (Yale University Publications in Anthropology). London: Humphrey Milford at the Oxford University Press, 1938. *Price* $1.50.

This book is essentially one for the specialist. An introduction to, and brief history of, the Kazak is followed by a general description of the nature of Kazak social groups. The main part of the book is concerned with detailed accounts of the various groups—economic, family, class, political—and their interrelationships. Lastly, there is a section dealing with the development of Mongol social organisation as a whole.

J. S. H.

Passing of the Aborigines. By DAISY BATES. London: John Murray, 1938. *Price* 10*s.* 6*d.*

This is one of the most interesting books it has been my pleasure to read. It is a remarkable story of thirty-five years lived among the Australian Aborigines. During this time the author, perhaps the last friend of a dying people,

ministered to their wants and won their respect and affection. Her work was genuinely for the natives ; she despised no manual labour herself and never made servants of the Aborigines. In no sense a missionary in the accepted meaning of the word, Mrs. Bates brought the natives the only Christianity they understood—kindness, trust, and example. Throughout all these years she was adding to her knowledge of the life and customs of the people, which is here recorded not in scientific parlance but in vivid accounts of her life, work, and wanderings. She spoke nearly two hundred native dialects and obtained an extraordinary insight into native mentality, which is reflected in numerous epigrammatic sentences summing up profound anthropological truths in a few short words.

Mrs. Bates loved the whole of nature, and interspersed with stories of human beings are beautiful descriptions of the wild life of the Aborigines' homeland. Nor were her experiences confined to living with the natives and observing nature. Among other things she assisted in a cattle-drive, helped missionaries to survey their property, attended meetings of the British Association, quelled a threatened revolt of natives, met royalty, and helped to fight a bush-fire.

Running like a thread through the book is the sad fact of the threatened extinction of the Aborigines. The author's life-work has been to make their passing easier. In his Introduction, Arthur Mee calls Mrs. Bates the most remarkable woman in Australia. Sir George Murray, in a Foreword, considers that the Order of Commander of the British Empire was never more worthily bestowed. To her Aborigines she was Kabbarli, grandmother. To all who read this book—and everyone should read it—she will be remembered as a noble woman who gave all, wealth and self, to help others. J. S. H.

Season of Birth : its Relation to Human Abilities. By ELLSWORTH HUNTINGTON. New York : John Wiley and Sons Inc. ; London : Chapman and Hall Ltd., 1938. *Price* 17*s.* 6*d.*

From an analysis of the available statistical material Dr. Huntington has reached the conclusion that children tend to be conceived in the greatest numbers when the season is most favourable to their parents' physical health, and that they are then born at a time when the parents are mentally alert and the weather least likely to interfere with the babies' early health. The majority of the race are thus born in March (or what in other climates corresponds to our Spring); but since all types, including the physically weak or emotionally instable, are stimulated by the seasonal rhythm to mate in June or July, mentally deficient or criminally-inclined children are also born in greater numbers in the following Spring, thus lowering the average intelligence-quotient of the March-born. Men of exceptional intelligence, Dr. Huntington finds, tend to be born in greatest numbers in January. In his calculations allowance has been made for many known sources of error, such as the tendency among Japanese parents to antedate the month of their boys' births when by so doing they can obtain for them an extra year's schooling, and for social and economic customs which may lead to the separation at certain seasons of husband from wife.

Dr. Huntington sees in these findings the implication that the whole human race for a very long time lived under and was conditioned by summer temperatures of about 62° F. followed by a spring average of 45°. Where the seasons are different the births appear to adapt themselves to the new climatic regime, notably in India, although it is disappointing to find the southern hemisphere (where, however, our records are short) dismissed in a few pages as confirming the general conclusions. Readers in this country may also be disappointed to find that the bulk of the generalisations are based on American conditions and are therefore not personally applicable (the English Census recording season of birth, inconveniently for the purpose of this study, by quarter-years instead of months). Many will feel that, great as is the bulk of statistics employed, our records are insufficient to justify the conclusions. But the book at least points the way to a new field of study for Eugenics, and although it is by no means light reading, it is expressed as lucidly as the subject will allow.

Madame Chiang's Messages in War and Peace. By Madame CHIANG KAI-SHEK. Hankow : China Information Committee, 1938. *Price* $12.50 (national currency).

It is not easy to evaluate this book on the lines of usual criticism. It contains a varied collection of writings by the brilliant and highly-educated woman who so ably shares her husband's direction of the affairs of China. For the chief part, in letters and articles alike, we find the reiteration of her burning conviction that China is " thrice-armed " by the absolute justice of her unsought " quarrel," and it seems impossible to contradict the assertions of a righteous cause that come from a heart wrung by the sorrows of one-fifth of the inhabitants of the world.

The book was printed under very great difficulties in Hankow and passed for the first part of its journey to us over the most bombed railway in the world. Although its publishers express the hope that " in good time a second and more befitting edition will be published," it is a grim comment that the battle-front has already been driven back some hundreds of miles west of Hankow. G.-B.

Arbres et Forêts. By LÉON and MAURICE PARDÉ. Paris : Collection Armand Colin, 1938. *Price* 15 *francs.*

A recent addition to an excellent and catholic series, this little book is remarkably clear and comprehensive for its size. Part I deals with generalities : the physical wants of forests in their natural state and their management after the interference of Man, " the destroyer and creator." Part II enumerates the principal types of forest and indicates their distribution. This section naturally includes some statistics of the world's forest resources, which are sometimes misleading when it is remembered that a commercial estimate needs to take account of accessibility. Part III describes in detail the species indigenous and introduced to France, their natural occurrence and the modifications made by man in their distribution. A fourth and final section discusses the less obvious uses of the forest. Much various and interesting information is incidental to this skeleton, but it is to be regretted, when so much stress has been laid on the geographical distribution of the subject, that there should be no map.

The World was My Garden. By DAVID FAIRCHILD. London : Charles Scribner's Sons Ltd., 1938. *Price* 18*s.*

This is a weighty book in every sense. The writer has been engaged for many years on behalf of the United States Government in plant exploration and collection in nearly every part of the world, his object being the naturalisation and popularisation in America of every plant which could possibly be of use, for food or otherwise. The result is a striking tribute to the genius of Mr. Fairchild.

Much of the book is necessarily technical and beyond the grasp of the average reader. But the author has travelled so widely and has so much to say about the different countries in which he was engaged that, sifted from the wealth of language used, there is much of general interest. We cannot think of any part of the world unvisited, except the Soviet Union. The book is magnificently and lavishly illustrated. S.

Europe at Play. By E. H. TATTERSALL. London : William Heinemann Ltd., 1938. *Price* 12*s.* 6*d.*

If one were to regard Mr. Tattersall's offering prosaically as a book, it would almost automatically assume the sub-title " The Idle Rich—By One Who Knows Them," replete as it is with photographs of seven lords, five princes, five honourables, four knights, three princesses, two counts and countesses, and one duke, earl, comtesse, comte, vicomte, marquis, royal duke and royal duchess. With Sir Hugh Walpole, who writes the Preface and who states that he feels

he is " quite the wrong person to preface this book," the reviewer feels he is quite the wrong person to review it. For " obviously these pages are concerned with a world within whose horizons I should be most unhappy and with occupations that would simply bore me to tears." But, as Sir Hugh goes on to explain, " the real subjects of this book are . . . three delightful things, food, sport and music. . . . It is a picture of a world dying, with sporting gestures, to fast music."

And so, perhaps more appropriately, we prefer to regard the offering of " Bunny " Tattersall, who goes in search of sun, in search of snow, in search of sport, and in search of " snippets of snow news," as a gastronomical delicacy—the lightest and most subtly flavoured of soufflées, cooked by " one of the most kindly and generous of men." D. B. C.

Himalayan Quest. By PAUL BAUER. London : Ivor Nicholson and Watson Ltd., 1938. *Price* 21*s.*

This deals firstly with the activities of a party of four in the Himalayas in 1936 and the ascent of Siniolchum, and secondly with the attack on Nanga Parbat in 1937 which ended in the death of seven German climbers and nine native porters. It is not written in a specially interesting style, but the part which deals with Nanga Parbat is intrinsically interesting on account of the nature of the expedition and the experience of the members.

The book again demonstrates the difference in outlook between the normal British mountaineer and the modern German. It would appear to us doubtful if the German policy of " death and glory " is wise, not only as it seems to result in the loss of European members on their expeditions, but more especially as it leads also to the death of native porters in their charge.

The book is profusely illustrated, and these illustrations are well up to the standard which we expect from German photographers. A. H.

Listen ! the Wind. By ANNE MORROW LINDBERGH. London : Chatto and Windus, 1938. *Price* 7*s.* 6*d.*

It is immaterial that the subject of this study is a survey flight by Colonel and Mrs. Lindbergh between West Africa and South America, although its concern, as Colonel Lindbergh appropriately comments in his Foreword, is with a period of aviation interesting if only for the fact that it is now past. What is of importance to the discriminating reader is that Mrs. Lindbergh has written a superior essay on cumulative frustration. It proved as difficult to take off from the Gambia River before dawn as from a derelict French airport in the Cape Verde Islands, and time and again Mrs. Lindbergh has us successfully deluded into thinking we are at last in the air. The atmosphere of tension is remarkable, conveyed as it is by a few lightly sketched minutiae, and there are no technical details to embarrass the uninitiated.

Many Rivers. By LEWIS R. FREEMAN. London : Jarrolds Ltd., 1938. *Price* 15*s.*

The author early became enamoured of exploring rivers, and the first he tells us about is the Yellowstone, which he ran in a home-made craft resembling a boat which gradually disintegrated into its component planks before he finished the course. This only whetted his appetite, and he describes, at possibly too great length, his experiences with his friends the rivers of Tahiti, Borneo, New Guinea, India, Irak and South America.

Mr. Freeman's descriptions of the countries through which these rivers run are told in light-hearted vein, and his observations on their characteristics and upon those of the peoples among whom he sojourned, or, rather, through whose countries he moved more or less swiftly, are entertaining. The book is well illustrated. S.